The Relationship Between Corporate Governance And Environmental Disclosure: UK Evidence

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The Relationship Between Corporate Governance And Environmental Disclosure: UK Evidence

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DEDICATION

To My Mother And To The Memory Of My Father

To My Husband And My Sons:

Ahmed And Marwan

Thank You For Your Love, Sacrifice, And Support

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All praise and thanks be to God, the most Gracious, the most Merciful, for giving me the strength to pursue and complete this work.

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May God reward them all.

ABSTRACT

The increasing global concern for the environment, the demand for increased stakeholder reporting, and the importance of sound corporate governance structures have triggered the need for more research into the value creation of environmental disclosure for stakeholders and its integration within corporate governance structures. The main objective of the current study is to empirically examine the relationship between corporate governance and each of the quantity and the quality of corporate environmental disclosures in the UK, while controlling for some corporate characteristics as well as an in-depth exploration of quality identification and assessment issues. In doing so, the study distinguishes between the different categories or areas of activity to which environmental disclosure relates as well as between the different types of environmental information content. Based on stakeholders-agency theory, the study argues that the quantity and quality of corporate environmental disclosure directed to various stakeholders are enhanced when managers' opportunism is monitored by corporate governance mechanisms, thereby, reducing the information gap or asymmetry.

Content analysis of a sample of UK companies' annual reports is undertaken to examine the quantity and quality of corporate environmental disclosure practices and their association with corporate governance mechanisms, over a period of four years. Hence, the annual reports of FTSE-All share companies are examined for years 2004-2007 inclusive. A checklist of environmental disclosure items and categories is developed and environmental disclosure indices are computed. The study suggests an extensive four-dimensional framework for assessing environmental disclosure quality. The metric developed attempts to capture the qualitative characteristics of information in a manner consistent with well-supported frameworks elaborated by professional accounting bodies and standard setting organizations.

Although corporate environmental disclosure quantity in UK companies' annual reports is relatively low, corporate environmental disclosure quality is comparatively high. Results also revealed a significant association between environmental disclosure quantity and, to a lesser extent, environmental disclosure quality and most corporate governance mechanisms. In addition, it appears that other corporate governance mechanisms are significant at some categorical levels of environmental disclosure. The major strength of the current study is its practical implications and its usefulness in providing data for further extensive environmental disclosure quality development. The comprehensive framework developed in this study for identifying and assessing environmental disclosure quality, is an initial step in the direction of examining environmental disclosure from the stakeholder perspective, negating the traditional belief of quantity representation of quality and shifting disclosure quality perspective from volumetric measurement to semantic assessment.

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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND AND OVERVIEW

The past four decades have witnessed an increasing global concern for the environment. This concern emerges mainly from the threat caused by the harmful effects and environmental problems resulting from the impact of economic growth. Various steps have been taken toward the protection of the environment from pollution and the conservation of natural resources, as a result of the consideration given to the social responsibility on one hand and as an application to, and compliance with, laws and regulations on the other hand. In this regard, the role of environmental accounting and reporting has emerged as a result of a concern for the relationship between the organization and the natural environment.

The growing public concern over the natural environment substantially increased awareness of corporate environmental responsibility. Companies are increasingly facing intensifying challenges to disseminate information about their environmental activities. Studies on corporate environmental reporting have proliferated. However, variations in corporate environmental reporting have been examined primarily in terms of corporate characteristics (such as size, industry grouping and financial performance) or general contextual factors (such as the social, political and economic context), while relatively little prior work has examined the internal contextual factors (corporate governance mechanisms) influencing disclosure practices (Adams, 2002), despite increasing emphasis on reporting processes and governance structures.

In a parallel movement, corporate governance has tremendously attracted attention in recent years. The term corporate governance rarely existed before 1990s (Keasey *et al.*, 2005b). Factors contributing to the increasing concern with corporate governance issues include unfriendly takeovers, institutional investors growing importance, increasing attention to directors' legal liability, pressure for more efficient and effective corporations, economic liberalisation, deregulation of industry and business,

the demand for new corporate values and stronger adherence to natural laws (Aras and Crowther, 2008; Joyner and Payne, 2002; Leblanc and Gillies, 2005). Several major corporate scandals rocked international businesses throughout 2001-2003 and were followed by corporate collapses, such as Enron Corporation in the US, Coloroll, Polly Peck, BCCI and later Barings in the UK, Parmalat in Europe and HIH Insurance Ltd in Australia (Mallin, 2011; Mallin *et al.*, 2005; O'Sullivan *et al.*, 2008). As a result, tighter regulations, codes, and principles of corporate governance came into force in response to these scandals (Aras and Crowther, 2008; Bury and Leblanc, 2007).

It is commonly argued that good corporate governance is associated with increased transparency and credible disclosure (see Ajinkya *et al.*, 2005; Cormier *et al.*, 2010; Dunstan, 2008; Gul and Leung, 2004). Corporate disclosure in general and corporate environmental disclosure in particular is, therefore, one of the biggest challenges facing the implementation of corporate governance. Corporate environmental disclosure extends the accountability of companies beyond the traditional role of providing financial disclosure assuming that companies have wider environmental responsibilities (Gray *et al.*, 1987). In this respect, environmental disclosure can be regarded as a means of ensuring sound corporate governance that integrates transparency in its environmental performance. This perspective is sometimes referred to as "governance-by-disclosure" wherein information disclosure is a concrete operationalization of transparency in the environmental domain (Gupta, 2008). In order to improve the quantity and quality of corporate environmental reporting, it is important to examine the impact of the different corporate governance mechanisms in explaining the variability in such disclosure practices. However, little research has been conducted that directly examines the relationship between corporate environmental disclosure and corporate governance, and still very few studies addressed such relationship in the UK. This is especially true in terms of environmental disclosure quality as opposed to the quantity of such disclosure.

The main objective of the current study is to empirically examine the relationship between corporate governance and each of the quantity and the quality of corporate environmental disclosures in the UK, while controlling for some corporate characteristics as well as an in-depth exploration of quality identification and

assessment issues. In doing so, the study distinguishes between the different categories or areas of activity to which environmental disclosure relates as well as between the different types of environmental information content.

This introductory chapter is aimed at providing an overview of the arguments that motivated undertaking the current research. It commences with presenting the wider background for the study and delineating the motivations that led to the pursuit of the current research. The core research questions addressed in the study are then outlined along with a depiction of the methodological assumptions and choices underpinning this study and the methods employed to undertake the study. A justification for the pursuit of the study is provided by highlighting its importance and contribution to knowledge. Finally, the structure and organisation of the thesis is portrayed.

1.2 MOTIVATION FOR THE STUDY

Conventional accounting systems, along with international accounting standards, fail to directly and systematically address environmental concerns (Samuels, 1990). Failure of the conventional accounting framework in taking into account the social and environmental impacts of corporate activities and, hence, the need for environmental accounting has motivated this research. Stakeho1ders are increasingly concerned with the way in which companies are responding to environmental issues (Gamble *et al.*, 1995). Conventional accounting systems failed to promote efforts that balance the different needs of various stakeholders. In other words, they failed to address economic growth against social and environmental needs (Saravanamuthu, 2004). Conventional accounting systems tend to prioritize economic goals and jeopardize any attempt to promote socio-environmental goals. Such systems tend ignore environmental issues unless they have a financial impact of sufficient materiality to warrant recognition according to international accounting standards frameworks.

Accordingly, there is an overall dissatisfaction with the mechanism of conventional accounting and its practices, the application of which results in unfavourable broader social and environmental consequences (Bebbington, 1997). Calls for change as to the

current nature and purpose of accounting (Gray and Collison, 2002) are motivated by the fact that corporate activity is no longer confined to the pursuit of profit maximization or economic growth (Bebbington, 2001). In this regard, the ability of information to induce a change in the behaviour of companies in addressing environmental issues should be emphasized. By providing information, companies tend to improve their performance in such areas that they publicly disclose. More recently, however, Beattie *et al.* (2004) reports a consensus among professionals and academics regarding an urgent need to expand the business reporting model beyond the traditional financial reporting model and to provide the information required for corporate transparency and accountability, through the development of disclosure metrics that facilitates research into voluntary disclosure quality (also see Beretta and Bozzolan, 2008). Particularly important is "developing new ways of documenting disclosure practices, identifying dimensions of disclosure quality and exploring possible measurement proxies" (Beattie *et al.*, 2004: 207).

In a similar vein, there has been a recent dissatisfaction with mandatory financial reporting that induced various stakeholders to demand more comprehensive and quality voluntary disclosures by companies about their long-term strategies and performance (Boesso and Kumar, 2007). This demand for enhanced voluntary disclosures has been reinforced by the stakeholder approach that a company has a wide range of stakeholders, not just shareholders, who have a right to information about the impact of the company's activities. Particularly emphasized is the value relevance of environmental disclosures to stakeholders (Clarkson *et al.*, 2011; Cormier *et al.*, 2011; Daub, 2007; van der Laan Smith *et al.*, 2005) that enables a company to demonstrate its accountability for its environmental activities. Despite the growth and development of corporate environmental disclosure practice, however, its ability to satisfy the information needs of various stakeholders is still questionable (Cormier *et al.*, 2011). Such dissatisfaction with mandatory disclosures, demand for increased stakeholder reporting and questionable informativeness of environmental disclosure have triggered the need for more research into the quality of environmental disclosures in order to provide clarifications about long-term corporate sustainability that concerns various stakeholder groups.

In addition, the current research is motivated by the need for sound corporate governance structures that effectively address the needs of various stakeholders. There have been a number of reasons for the upsurging attention to corporate governance in the UK. Particularly important is the impetus given by several major corporate scandals that rocked businesses in the late 1980s and the subsequent corporate collapses, such as Coloroll, Polly Peck, BCCI and later Barings in the UK (Keasey *et al.*, 2005a; Mallin, 2011; Mallin *et al.*, 2005). These scandals involved the use of creative accounting deterring evident calculation of shareholder value (Whittington, 1993), the weak link between excessive executive pay and corporate performance (Keasey and Wright, 1993), managerial expropriation of stakeholders' funds, the limited role of auditors and the short-term detrimental perspectives of economic performance adopted by the market for control and institutional investors (Keasey *et al.*, 2005a).

The previous discussion reveals that failure of conventional accounting systems to provide direct and systematic treatment of environmental issues, dissatisfaction with mandatory disclosures, demand for increased stakeholder reporting, questionable informativeness of environmental disclosure, and importance of sound corporate governance structures that effectively address the needs of various stakeholders have all motivated the current research. Particularly, these influences triggered the need for more research into the value creation of environmental disclosure for stakeholders and its integration within corporate governance structures.

1.3 RESEARCH QUESTIONS

The main objective of the current study is to empirically examine the relationship between corporate governance and each of the quantity and the quality of corporate environmental disclosures in the UK, while controlling for some corporate characteristics as well as an in-depth exploration of quality identification and assessment issues. In order to achieve the current research objective, the study seeks to investigate the following questions:

1. What is the extent of total corporate environmental disclosure quantity and the quantity of environmental disclosure within each disclosure category in the annual reports of UK companies? What is the trend in total corporate environmental disclosure quantity and the quantity of environmental disclosure within each disclosure category over time?

2. What is the extent of the relationship, if any, between corporate environmental disclosure quantity and corporate governance mechanisms? Whether the relationship, if any, between corporate environmental disclosure quantity and corporate governance mechanisms varies according to the disclosure area being examined?

3. What is the extent of total corporate environmental disclosure quality and the quality of environmental disclosure within each disclosure category in the annual reports of UK companies? What is the trend in total corporate environmental disclosure quality and the quality of environmental disclosure within each disclosure category over time?

4. What is the extent of the relationship, if any, between corporate environmental disclosure quality and corporate governance mechanisms? Whether the relationship, if any, between corporate environmental disclosure quality and corporate governance mechanisms varies according to the disclosure area being examined?

5. How the individual qualitative characteristics or dimensions of total corporate environmental disclosure quality are correlated to the different corporate governance mechanisms?

Providing answers to the above research questions are guided by both theoretical evidences and empirical findings.

1.4 RESEARCH SCOPE AND METHODOLOGY

The current study adopts an objective methodological position of philosophical assumptions. Ontologically, the current study adopts a realism position. Epistemologically, the study takes a positivism position. Regarding the human nature

assumptions, the current study assumes determinism. Accordingly, human beings are mainly considered as conditioned by their external circumstances. In this regard, the current research seeks objectively measurable and observable human behaviour. These philosophical assumptions imply that the study is inclined towards an objective nomothetic methodology, where quantitative research methods are made use of. Therefore, the study seeks a quantitatively measured description and exploration of the perceived reality of environmental disclosure and corporate governance.

Consequently, the current study would include two different, but complementary, quantitative empirical research analyses. The differentiation is based on the phenomenon being analyzed for achieving the research objectives. First, quantitative analysis, using content analysis of a sample of UK companies' annual reports, will be undertaken to examine the quantity of corporate environmental disclosure practices and their association with corporate governance mechanisms, over a period of four years. Second, quantitative analysis, using content analysis of a sample of UK companies' annual reports, will be undertaken to examine the quality of corporate environmental disclosure practices and their association with corporate governance mechanisms, over a period of four years. Hence, the annual reports of FTSE-All share companies are examined for years 2004-2007 inclusive. A checklist of environmental disclosure items and categories is developed and environmental disclosure indices are computed. In doing so, the study distinguishes between the different categories or areas of activity to which environmental disclosure relates as well as between the different types of environmental information content.

1.5 RESEARCH CONTRIBUTION TO KNOWLEDGE

The main contribution or originality of the current research is its being the first study, to the best of my knowledge, to empirically address corporate environmental disclosure quality assessment in line with the international accounting standards framework. The study introduces to the academic literature an extensive four-dimensional framework for assessing environmental disclosure quality. The metric developed by the current study is the first comprehensive aggregate environmental-disclosure measure, as far as I am aware, that attempts to capture the qualitative

characteristics of information in a manner consistent with well-supported frameworks elaborated by professional accounting bodies and standard setting organizations. It negates the traditional belief of quantity representation of quality and shifts disclosure quality perspective from volumetric measurement to semantic assessment. Such research investigating issues as environmental disclosure quality identification and assessment that are still relatively unexplored is quite essential.

Botosan (2004) recommends that quality identification and measurement issues and questions are critically important and worthy of careful attention, and suggests that addressing these issues and questions, through the development of disclosure quality assessment frameworks in a specific research context, represents a necessary next step in the advancement of disclosure research. Furthermore, Beattie *et al.* (2004) highlights the pressing need for research effort devoted to developing new ways of documenting disclosure practices, identifying disclosure quality dimensions and exploring possible measurement proxies. In this respect, the current study is expected to fill an existing gap in corporate environmental disclosure literature by adding to a relatively underdeveloped research area which is corporate environmental disclosure quality assessment.

This study is important for several reasons. First, and most important, is the limited research on the impact of corporate governance on corporate environmental disclosure. Second, no prior research uses comprehensive governance indicators or thoroughly examines the relationship in a complete manner. Third, very few prior studies have been conducted in the UK. Fourth, most previous studies concentrate on the volume of disclosure rather than its quality. Fifth, samples examined in prior literature have tended to be small and homogeneous, thus are restricted in both size and industrial composition. Sixth, most existing studies are mainly cross-sectional in nature. Finally, many earlier studies depend solely on a method of estimation typically, Ordinary Least Squares (OLS), which is unsuitable in the context of categorical censored data such as those typically gleaned from content analysis.

The present study goes a step further. The study intends to systematically extend prior research within a UK context and to overcome the limitations inherent in prior research. Consequently, the study expects to contribute to the corporate environmental responsibility knowledge in this area. The current study contributes to two streams of

literature, the disclosure literature and corporate governance literature, by providing updated documentary and empirical evidence on the association between corporate governance mechanisms and each of the quantity and quality of environmental disclosure practices in the annual reports of UK companies, while controlling for corporate characteristics.

In doing so, the study distinguishes between the different categories or areas of activity to which environmental disclosure relates including environmental policies, environmental product and process-related, regulatory compliance, environmental auditing, sustainability and other environmentally-related information. Adopting a disaggregated view of environmental disclosures identifying its main themes or categories rather than only an aggregated understanding would provide deeper understanding of and richer insights into disclosure quantity (see Beattie *et al.*, 2004), thereby help to comprehensively profile the disclosure strategies adopted by the company (Beretta and Bozzolan, 2004).

The study provides a comprehensive representation of corporate governance by incorporating several corporate governance mechanisms as possible explanatory variables for the quantity and quality of corporate environmental disclosure practices of UK companies. Corporate governance mechanisms are classified into the following three groups: (1) Board Characteristics; (2) Board Committees Characteristics; and (3) Ownership Structure. The key advantage to using this setting is the existence of multiple, yet complementary corporate governance mechanisms that act as monitoring mechanisms enforcing management to act in the best interest of stakeholders which, in turn, might affect the disclosure decision. Taken together, these governance mechanisms influence the emphasis placed on environmental issues and the manner in which the role of a corporation and its stakeholders are defined in a society. This, in turn, is reflected in corporate environmental disclosure practices.

The study attempts to develop a broadly-defined disclosure quality index in line with the international accounting standards framework that captures the distinct nature of disclosure items and that distinguishes the different types of information content. The development of an overall index encompassing the different qualitative characteristics of the information disclosed would be a major contribution of the present study. Another point that is considered by the study in the quantity versus quality issue of

environmental disclosures is the independent focus upon each individual indicator of quality rather than only an aggregated measure of quality. This would permit insight into whether indicators are complements or substitutes, as well as revealing the extent to which each is associated with particular corporate governance characteristics (Brammer and Pavelin, 2006).

The study examines the annual reports of a large and industrially diverse sample; that is, FTSE All-Share Index, which is the broadest index of UK listed companies. The use of a large and industrially diverse sample permits a more comprehensive exploration of the impact of the different corporate governance characteristics upon corporate environmental disclosures.

The present study sets out to define its sample both in longitudinal and cross-sectional perspective so as to provide a contribution to the literature on determinants of environmental reporting of UK companies. It conducts a longitudinal analysis over 2004-2007 inclusive. It is the first study - as far as I am aware - to undertake a systematic longitudinal analysis of corporate environmental disclosure and corporate governance characteristics within the UK. If such relationships exist, they may well only be revealed over time. Moreover, it will help trace the trend of disclosure and the impact of corporate governance against the backdrop of environmental and economic development in the country (Haniffa and Cooke, 2005). Longitudinal analysis would help to resolve issues concerning causality and shed more light on the evolving pattern of the environmental disclosures (Brammer and Pavelin, 2006).

The study employs several types of regression models and statistical analyses including descriptive statistics; Pearson and Spearman correlations; and OLS, GLS and pooled OLS regressions. Such analyses are undertaken to test the research hypotheses and to attest the reliability of the main OLS regression results. Sensitivity analysis is carried out to check the sensitivity and, hence, the robustness of the main regression analysis.

Based on stakeholder-agency theory, the study's argument can be put forward as follows. Companies are increasingly considering the importance of demonstrating commitment to environmental responsibility, through the provision of comprehensive and high-quality environmental disclosure as means of managing their relationships

with stakeholders. In this respect, sound systems of corporate governance are serving as accountability mechanisms, by which companies are made responsive to the rights and needs of stakeholders, through reducing information asymmetry. Therefore, it can be argued that the quantity and quality of corporate environmental disclosure directed to various stakeholders are enhanced when managers' opportunistic manipulation is monitored by corporate governance mechanisms.

The overall empirical results reinforce the study's general argument that corporate governance plays an important role in determining how companies mitigate agency problems and respond to the needs and interests of various stakeholder groups and, consequently, in determining the quantity and quality of corporate environmental disclosures in the annual reports. The informativeness or value relevance of environmental disclosure is a critical issue for standard-setters, investors, corporate decision-makers, and researchers (Berthelot *et al.*, 2003). Accordingly, the current study has the potential of attracting the attention of those concerned about corporate accounting and who may be interested in using its findings in order to inform any future endeavour to guide UK companies' corporate environmental disclosure practices, by embedding and integrating such guidance within companies' corporate governance structures.

1.6 STRUCTURE OF THE THESIS

This section depicts the structure and organisation of the current research while providing an overview of its contents. The thesis is organised into seven chapters as follows. Chapter one is an introductory chapter that presents the background for the study along with the principal motivation behind undertaking the current research. The chapter then addresses the core research questions followed by a depiction of the methodological assumptions and choices underpinning this study and the methods employed to undertake the study. A justification for the pursuit of the study is provided by highlighting its importance and contribution to knowledge.

Chapter two provides a review of the pertinent literature. It commences with an overview of corporate environmental disclosure practices. The concept of corporate

governance is introduced along with tracing the evolution and historical development of corporate governance code of best practice in the UK. The chapter then explores prior literature on the quantity and quality of corporate environmental disclosure and their association with corporate governance mechanisms. Previous studies are divided into the following three streams of studies that are relevant to the present study: prior studies examining the relationship between environmental disclosure quantity and each of corporate characteristics and corporate governance; prior studies examining the relationship between environmental disclosure quality and each of corporate characteristics and corporate governance; and prior studies examining environmental disclosure quality identification and assessment issues. The chapter concludes with a discussion highlighting possible reasons for the failure of prior research to establish consistent and conclusive results and identifying any gaps in the existing literature.

Chapter three outlines the theoretical framework adopted by the current study. It reviews the different theories that help explain each of environmental disclosure and corporate governance practices, followed by an analysis and critique of the different theoretical perspectives employed. The chapter presents a detailed discussion of the proposed theoretical framework for the current study, justifying the choice of such framework in explaining the relationship between each of environmental disclosure quantity and quality and corporate governance. It provides the foundation on which the study is constructed and will guide the interpretation of results and findings.

Chapter four depicts the research methodology employed by the current study. It commences with explaining the research philosophy or the methodological viewpoint of the research and how this verifies the choice of methods to be used in carrying out the study. The research design for the required analysis is developed. Quantitative analysis, using content analysis of a sample of UK companies' annual reports, is undertaken to examine the quantity and quality of corporate environmental disclosure practices and their association with corporate governance mechanisms. In doing so, the study distinguishes between the different categories or areas of activity to which environmental disclosure relates as well as between the different types of environmental information content.

Chapter five constitutes the first part of the empirical work aimed at quantitatively investigating the relationship between corporate governance mechanisms and the

quantity of corporate environmental disclosure practices in UK companies' annual reports using content analysis. The chapter describes a variety of statistical tests and analyses, including descriptive statistics, correlation analysis and regression analysis undertaken in order to measure the extent and trend in corporate environmental disclosure quantity and to examine the relationship in question, while controlling for corporate characteristics. It reports the results of the study in terms of the theoretical framework adopted and conclusions are drawn from statistical findings.

Chapter six constitutes the second part of the empirical work aimed at quantitatively investigating the relationship between corporate governance mechanisms and the quality of corporate environmental disclosure practices in UK companies' annual reports using content analysis. The chapter describes a variety of statistical tests and analyses, including descriptive statistics, correlation analysis and regression analysis undertaken in order to measure the extent and trend in corporate environmental disclosure quality and to examine the relationship in question, while controlling for corporate characteristics. It reports the results of the study in terms of the theoretical framework adopted and conclusions are drawn from statistical findings.

Chapter seven presents the results, findings and conclusion of the research. The chapter brings together a summary and conclusion of the research principal findings highlighting some potential implications on how to develop corporate environmental disclosure practices. It also sheds light on the contributions made by the current research to corporate environmental disclosure literature and identifies the limitations of the study. The chapter offers some suggestions and recommendations for future research.

Chapter 2

LITERATURE REVIEW

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

Corporate environmental disclosure has been a significant area of academic interest, and has precipitated a substantial literature since the 1970s. A considerable body of literature from a wide range of theoretical backgrounds concluded that environmental disclosures are an important phenomenon employed by corporations (Gray *et al.*, 2001) and are influenced by a variety of explanatory factors. Prior research has been primarily concerned with the extent and nature of corporate environmental disclosure within annual reports and its trend over time; its relationship to economic performance, environmental performance and corporate reputation; as well as the effect of certain corporate characteristics on the tendency to disclose environmentally relevant information.

However, little research has been conducted that directly examines the relationship between corporate environmental disclosure and corporate governance, and still very few studies addressed such relationship in the UK. This is especially true in terms of environmental disclosure quality as opposed to the quantity of such disclosure. In addition, not all the principles of corporate governance have been examined in the literature, despite the fact that previous research has acknowledged that good corporate governance is associated with increased transparency and credible disclosure (see Ajinkya *et al.*, 2005; Cormier *et al.*, 2010; Dunstan, 2008; Gul and Leung, 2004).

The main objective of the current study is to empirically examine the relationship between corporate governance and each of the quantity and the quality of corporate environmental disclosures in the UK, while controlling for some corporate characteristics as well as an in-depth exploration of quality identification and assessment issues. The following three streams of studies are relevant to the present

study: prior studies examining the relationship between environmental disclosure quantity and each of corporate characteristics and corporate governance; prior studies examining the relationship between environmental disclosure quality and each of corporate characteristics and corporate governance; and prior studies examining environmental disclosure quality identification and assessment issues.

The remainder of this chapter is organized as follows. The first section provides an overview of corporate environmental disclosure practices. The second section introduces the concept of corporate governance and traces the evolution and historical development of corporate governance code of best practice in the UK. The next three sections are devoted to reviewing prior studies investigating the relationship between environmental disclosure quantity and each of corporate characteristics and corporate governance; prior studies investigating the relationship between environmental disclosure quality and each of corporate characteristics and corporate governance; and prior studies investigating environmental disclosure quality identification and assessment issues respectively. The final section, discussion of prior research, analytically explores possible reasons for the failure of prior research to establish consistent and conclusive results and specifically identifies any gaps in the existing literature.

2.2 CORPORATE ENVIRONMENTAL DISCLOSURE: AN OVERVIEW

Corporate social responsibility (CSR) reporting, of which environmental reporting is a part, is not a new phenomenon and has been traced as far back as 5000 BC in Egypt (Anderson, 1989). However, environmental reporting within corporate annual reports has attracted increased interest since the early 1990s and this interest acquired great momentum by the sustainable development debate started by the Brundtland Report (1987) (Jones, 2011). Unlike other aspects of corporate social responsibility, environmental reporting is a relatively recent feature of corporate financial reporting, where the need and value relevance of environmental information for stakeholders is an under-researched area; environmental disclosures are not explicitly required by most national and international accounting standards and laws; and environmental

issues rarely appear in the agenda of either prospective accountants or prospective business managers (Adams, 1998).

Environmental disclosures "constitute part of what frequently are labelled social responsibility disclosures. Social responsibility disclosures can include, among other things, disclosures relating to the interaction between an organization and its physical and social environment" (Deegan and Rankin, 1996: 51). Social and environmental disclosure "can typically be thought of as comprising information relating to a corporation's activities, aspirations and public image with regard to environmental, community, employee and consumer issues" (Gray, *et al.*, 2001: 329).

Environmental disclosures are simply defined as "those disclosures pertaining to the impact that an organizational process or operation may have on the natural environment" (Campbell, 2004: 108). In a detailed manner, Berthelot *et al.* (2003: 2) define corporate environmental disclosure as "the set of information items that relate to a firm's past, current and future environmental management activities and performance. Corporate environmental disclosure also comprises information about the past, current and future financial implications resulting from a firm's environmental management decisions or actions."

Corporate environmental disclosure is defined by the current study as the process of disseminating information on the impact corporate economic activities have on the natural environment for use by diverse stakeholders. Corporate environmental disclosure extends the accountability of companies beyond the traditional role of providing financial disclosure assuming that companies have wider environmental responsibilities (Gray *et al.*, 1987). In this regard, environmental disclosure can be regarded as a means of ensuring sound corporate governance that integrates transparency in its environmental performance. This perspective is sometimes referred to as "governance-by-disclosure" wherein information disclosure is a concrete operationalization of transparency in the environmental domain (Gupta, 2008). The most distinguishing feature of environmental disclosure is its voluntary nature, particularly in the UK context. Consequently, environmental reports are characterized by their diversity in terms of disclosure quantity and quality.

Solomon (2000) conducted a survey to identify aspects of environmental reporting in comparison to financial reporting. The results suggest that the implicit conceptual framework for environmental reporting resembles the explicit financial reporting conceptual framework in the UK in many respects. The survey revealed that the users of financial reporting are also the users of environmental reporting, although greater emphasis is attached to some users than others; all qualitative characteristics of financial reporting also relate to environmental reporting; verification is necessary for environmental reporting as for financial reporting; companies bear the cost of environmental reporting as with financial reporting; the most appropriate presentation of environmental reporting is within annual reports as with the financial reporting. However, the survey also indicated differences between environmental and financial reporting where the elements of environmental reporting are quite different from those of financial reporting; there is no consensus on who should perform verification for environmental reporting; and less emphasis is placed by company management on environmental reporting issues than that by users.

Stakeholders are increasingly demanding environmental information and, hence companies need to justify their activities by communicating the environmental dimensions of their operations rather than confining themselves to communicating only the economic dimensions (Cormier *et al.*, 2011, Daub, 2007). As such, environmental disclosure has social as well as economic dimensions (Buhr and Freedman, 2001). In this regard, environmental disclosure is an important means of communicating the impact of a company's environmental activities to various stakeholder groups. It enables a company to demonstrate its accountability for its environmental activities (Gray *et al.*, 1987; Gray *et al.*, 1996). Despite the growth and development of corporate environmental disclosure practice, however, its ability to satisfy the information needs of various stakeholders is still questionable (Cormier *et al.*, 2011).

Corporate environmental reporting is justified on several grounds. An international study of environmental reporting in European, Japanese and North American companies found that the main reasons underlying the dissemination of corporate environmental information are a sense of duty to the environment, public relations, competitive advantage and future legal requirements (Hodgkinson, 1993). Moreover,

the study reported the main audiences targeted by environmental reporting as being employees, shareholders, the media, environmental activists, customers and trade and industry associations (Hodgkinson, 1993), in addition to suppliers, regulators, local communities and science and education (UNEP/SustainAbility, 1996). A variety of media can be used to disclose environmental information, including annual reports, stand alone environmental reports, advertisements or articles, booklets, leaflets or brochures, labelling of products, newsletters, press releases, supplements to the annual report or interim reports, video tapes, and websites (Gray *et al.*, 1995b; Jenkins and Yakovleva, 2006; Zeghal and Ahmed, 1990).

2.2.1 Corporate Environmental Disclosure Quantity

Various types of environmental information exist in terms of themes and topics. There is no clear definition of what constitutes environmental information. Most prior studies define environmental information on the basis of an early survey of Ernst and Ernst (1978) that identifies the environment as one of the main categories of corporate social reporting, being comprised of such information items as pollution control, prevention or repair of environmental damage, conservation of natural resources and other environmental disclosures. According to Roberts (1991), environmental information encompasses a range of items that can be broadly categorized into environmental protection statements, process-related information, product information, environmentally-related investments, environmentally-related research and development, energy usage information, political statements, employment information and health and safety information.

However, the majority of previous studies have adopted an aggregated view of environmental disclosures rather than disaggregating disclosures into main themes or categories (Campbell, 2004). Although these studies included some sort of classification scheme of environmental disclosures, they did not separately identify such disclosure groupings or individually incorporate them into empirical analyses (see for example, Brammer and Pavelin, 2006; Deegan and Gordon, 1996; Deegan and Rankin, 1996; García-Ayuso and Larrinaga, 2003; Halme and Huse, 1997; Post *et al.*, 2011; Stanny and Ely, 2008).

The absence of definite environmental information content has motivated initiatives to develop a comprehensive framework for environmental disclosures. A remarkable and prominent framework is the Global Reporting Initiative (GRI) developed in co-operation with the United Nations Environment Programme (UNEP). The GRI is aimed at disseminating globally applicable sustainability reporting guidelines to enable organisations to voluntarily disclose the social, environmental and economic dimensions of their activities (GRI, 2002). Another ethical performance framework introduced by the Institute for Social and Ethical Accounting (ISEA, 1999) is referred to as Accountability AA1000 Assurance Standard. Other international standards and guidelines reinforcing environmental reporting have emerged which can be classified under three distinct but complementary categories, including codes of conduct (e.g. OECD guidelines) which define standards of corporate behaviour; management standards (e.g. ISO14000) which offer framework for implementing socially responsible practices; and screenings and rankings (e.g. Dow Jones sustainability index, FTSE4Good) which provide basis for responsible investing (Hopkins, 2003).

A distinctive feature of such environmental reporting initiatives and frameworks developed by research organisations such as the Organization for Economic Co-operation and Development (OECD, 2001), the Association of Chartered Certified Accountant (ACCA, 1999) and the Institute for Social and Ethical Accounting (ISEA, 1999) is an attempt to relate corporate governance structure, social and environmental accounting and stakeholder reporting (Boesso and Kumar, 2007). Similarly, the UK-based Center for Social and Environmental Accounting Research (CSEAR) and the Institute for Social and Ethical Accountability (ISEA) have also linked corporate voluntary environmental disclosure practices to long-term corporate sustainability (see Boesso and Kumar, 2007 for a full review of such organisations and initiatives).

For the purposes of the current study, corporate environmental disclosure is taken to comprise disclosures relating to the company's environmental policies, environmental product and process-related, compliance with environmental laws and standards, environmental auditing, sustainability and other environmentally-related information. Each of these categories, which are developed based on both prior literature and international standards and guidelines such as GRI will be separately investigated for fuller depiction of variability in corporate environmental disclosure practices.

2.2.2 Corporate Environmental Disclosure Quality

Quality is a generic and holistic term that has different meanings to different people. Several definitions of disclosure quality have been suggested in prior literature. For example, disclosure quality is defined as the accuracy of investors' beliefs about stock prices following the disclosure (Diamond and Verrecchia, 1991). King (1996) defines disclosure quality as the degree of self-interested bias in corporate disclosure. Disclosure quality also refers to the extent to which current and potential investors can read and interpret the information easily (Hopkins, 1996). In line with the IASB framework of the qualitative characteristics of information, Botosan (2004: 290) argues that "high-quality information is information that helps users make informed economic decisions". Brammer and Pavelin (2006) argue that environmental disclosure quality is not necessarily or straightforwardly linked to the quantity of such disclosure and that quality is more of reporting specific actions, quantifying environmental impact, setting formal targets, and being subject to external audit.

Each of these definitions refer to a particular qualitative characteristic of the disclosed information and largely dependent upon the purpose of the research. Gibson and O'Donovan (2007) emphasize that while such classification may enable inferences to be drawn about the quality of information, much work still needs to be undertaken in terms of quality definition and the associated qualitative judgments. Botosan (2004) argues that the definition of quality should be based on well-supported frameworks elaborated by professional accounting bodies and standard setters because they reflect a generally accepted notion of disclosure quality. This perspective quite fits with the purpose of the current study as no specific user group is of particular interest to the research, but rather all diverse stakeholder groups are targeted. A broader and more general all-purpose definition of disclosure quality, therefore, seems appropriate. Consistent with Botosan's (2004) approach, corporate environmental disclosure quality is defined in the current study in terms of the information qualities or characteristics identified by the International Accounting Standards Board (IASB); comparability, understandability, relevance, and reliability (IASB, 1989).

The IASB states that information is 'comparable' in the sense that "Users must be able to compare the financial statements of an entity through time in order to identify trends in its financial position and performance. Users must also be able to compare

the financial statements of different entities in order to evaluate their financial position, performance and changes in financial position" (IASB, 1989: 39). Implicit in the IASB framework is that 'comparability' requires consistent treatment of information. For the purposes of the current study, 'comparability' can be defined as the ability of information to consistently allow corporate performance appraisal, pointing out similarities and differences across time, across companies and across standards and norms through consistent presentation of information in a form that directly reveals impact of environmental activities on overall corporate performance. From the researcher's viewpoint, 'comparability' is permitted with the financial quantification of information that can be elaborated through non-financial quantification and descriptive forms.

The IASB states that information should be readily 'understandable' by users who 'have reasonable knowledge of business and economic activities and accounting and a willingness to study the information with reasonable diligence' (IASB, 1989: 25). The IASB (1989) defines 'understandability' as both user-specific and topic-specific. For the purposes of the current study, 'understandability' can be defined as the ease with which users of information can perceive, interpret, and evaluate specific environmental topics in terms of their benefit or detriment to corporate performance. According to the researcher, 'understandability' is facilitated when the economic direction or sign of information is clear.

The IASB states that information is 'relevant' "when it influences the economic decisions of users by helping them evaluate past, present of future events or confirming, or correcting, their past evaluations" (IASB, 1989: 24). Implicit in the IASB framework is that relevant information should have predictive and feedback value. For the purposes of the current study, 'relevance' can be defined as the ability of information to convey expectations about future environmental conduct based on past and present performance. From the researcher's viewpoint, 'relevance' is achieved via the provision of forward-looking information in addition to historical information.

The IASB states that information is 'reliable' when "it is free from material error and bias and can be depended upon by users to represent faithfully that which it either purports to represent or could reasonably be expected to represent" (IASB, 1989: 24).

The IASB (1989) defines 'reliability' in terms of faithful representation (correspondence or agreement between the measures or descriptions and the phenomena they represent), neutrality (freedom from bias), prudence (degree of caution in face of uncertainty), completeness (no omission of material information), and substance over form (substance of the phenomena regardless of their legal form). For the purposes of the current study, 'reliability' can be defined as the credibility of information in terms of accuracy and veracity that builds users' confidence and trust in environmental disclosures. According to the researcher, 'reliability' is assured through verification or auditing.

2.2.3 Corporate Environmental Disclosure Initiatives in the UK

There is a general rise in corporate environmental disclosures in the UK (KPMG, 1999) and this rise is linked to the increase in mandatory disclosures and the stability of voluntary disclosures (Haron *et al.*, 2004). Some of the events that have contributed to the development of environmental reporting in the UK include the appointment of a minister for corporate social responsibility in March 2000; the European Union's Fifth Action Programme on the Environment and its Towards Sustainability Report 1992; the European Union's Environmental Management and Audit Scheme (EMAS) 1993; the Institute of Chartered Accountants in England and Wales (ICAEW) Guidelines 1993; the Association of British Insurers' (ABI) Guidelines; and the FTSE4Good Index 2001 (Idowu and Towler, 2004; Rizk, 2006). However, the content of environmental disclosures varies widely across companies since it is largely unregulated (Cormier and Magnan, 2003). Corporate environmental disclosure practices are characterized by their diversity due to "lack of mandatory regulation, sketchy adoption of voluntary guidelines, and variable quality of verification" (Hammond and Miles, 2004).

An important constituent of the UK legal framework for environmental disclosure was the reporting requirements of the operating and financial review (OFR), which was incorporated into law by the Companies Act 1985 (ASB, 2005). The OFR was repealed based on the claims that it was unnecessary burdensome for companies (Williamson and Lynch-Wood, 2008). More recently, the UK government has

emphasized the significance of environmental reporting, through the amendment of the Companies Act 2006, requiring companies to report on essential environmental issues in corporate annual reports and to follow the UK Government's Environmental Key Performance Indicators (KPI) - Reporting Guidelines (Sun *et al.*, 2010). However, it is unlikely that the information needs of stakeholders will be satisfied as the new reporting requirements are not supported by statutory guidelines and robust auditing requirements, which potentially undermine the integrity of the reported information (Williamson and Lynch-Wood, 2008).

Nevertheless, current corporate environmental reporting in the UK is essentially a voluntary self-regulatory activity guided by several national and international environmental reporting initiatives and frameworks. Particularly influential in promoting the development of environmental reporting practices are the Global Reporting Initiative (GRI) and the Accountability AA1000 Assurance Standard. Other international standards and guidelines reinforcing environmental reporting have emerged which can be classified under three distinct but complementary categories, including codes of conduct (e.g. OECD guidelines, ILO declaration) which define standards of corporate behaviour; management standards (e.g. SA8000, ISO14000) which offer framework for implementing socially responsible practices; and screenings and rankings (e.g. Dow Jones sustainability index, FTSE4Good) which provide basis for responsible investing (Hopkins, 2003).

2.3 THE EMERGENCE AND DEVELOPMENT OF CORPORATE GOVERNANCE CODES IN THE UK

Corporate governance has recently become one of the most distinctive features of modern corporations. Corporate governance simply refers to how a corporation is governed (NACD, 2006). The Cadbury Report defined corporate governance as "the system by which companies are directed and controlled" (Cadbury, 1992: para. 2.5). The Organization for Economic Co-operation and Development (OECD) defined corporate governance as "a set of relationships between a company's management, its board, its shareholders and other stockholders. Corporate governance also provides the structure through which the objectives of the company are set and the means of

attaining those objectives and monitoring performance are determined" (OECD, 2004: 11).

Consistent with the OECD perspective, several attempts have been made to define corporate governance within the accounting literature. Demb and Neubauer (1992: 187) stated that "Corporate Governance is the process by which corporations are made responsive to the rights and wishes of stakeholders". Monks and Minow (1995: 1) argued that "It is the relationship among various participants in determining the direction and performance of corporations". While, Tricker (1994: xi) wrote that "Corporate governance addresses the issues facing board of directors such as the interaction with top management and relationships with the owners and others interested in the affairs of the company, including creditors, debt financiers, analysts, auditors, and corporate governance". Corporate governance is also broadly defined as "the manner in which companies are controlled and in which those responsible for the direction of companies are accountable to the stakeholders of these companies" (Dahya *et al.*, 1996: 71).

Corporate governance structures define "the relationship between a firm and its stakeholders" (van der Laan Smith *et al.*, 2005). Therefore, corporate governance is viewed as effectively outlining the rights and responsibilities of each group of stakeholders in the company (Ho and Wong, 2001). Under this perspective, the governance structure shifts from a principal-agent to a team production model, and the critical governance tasks become to ensure effective, coordination, cooperation and conflict resolution to maximize, rather than just control and to distribute the value created in ways that maintain commitment multiple stakeholders (Kochan and Rubinstein, 2000).

The above definitions illustrate well what corporate governance is. It is concerned with both internal aspects of the company, such as internal controls and board structure, and external aspects such as the relationship with shareholders and other stakeholders. More recently, however, corporate governance has been linked to long-term corporate sustainability that concerns various stakeholder groups. For example, Aras and Crowther (2008: 2) argued that "Corporate governance can be considered as an environment of trust, ethics, moral values and confidence – as a synergic effort of

all the constituents of society – that is the stakeholders, including government; the general public etc; professional/service providers – and the corporate sector".

Historically, corporate governance received little attention (Bury and Leblanc, 2007). The term corporate governance rarely existed before 1990s (Keasey *et al.*, 2005b). However, corporate governance has tremendously attracted attention in recent years. Factors contributing to the increasing concern with corporate governance issues include unfriendly takeovers, institutional investors growing importance, increasing attention to directors' legal liability, pressure for more efficient and effective corporations, economic liberalisation, deregulation of industry and business, the demand for new corporate values and stronger adherence to natural laws (Aras and Crowther, 2008; Joyner and Payne, 2002; Leblanc and Gillies, 2005). Several major corporate scandals rocked international businesses throughout 2001-2003 and were followed by corporate collapses, such as Enron Corporation in the US, Coloroll, Polly Peck, BCCI and later Barings in the UK, Parmalat in Europe and HIH Insurance Ltd in Australia (Mallin, 2011; Mallin *et al.*, 2005; O'Sullivan *et al.*, 2008). As a result, tighter regulations, codes, and principles of corporate governance came into force in response to these scandals (Aras and Crowther, 2008; Bury and Leblanc, 2007). Fombrun (2006) argues, however, that sound corporate governance is not just a matter of following a set of rules, but rather a continuous process of relevant strategy implementation aimed at maximizing long-term value creation.

What constitutes good corporate governance may vary in the specific recommendations being made. However, most codes of best practices emphasize improving corporate governance practices and disclosure in five major areas: board structure, audit and financial controls, executive compensation, shareholders rights, and market for control (Fombrun, 2006). A wider perspective of good corporate governance is one that addresses such issues as sustainable value creation, goal achievement and socio-economic balance. Corporate governance ratings indicate that UK companies are generally credited with having the most progressive governance policies (Fombrun, 2006).

There have been a number of reasons for the upsurging attention to corporate governance in the UK. Particularly important is the impetus given by several major corporate scandals that rocked businesses in the late 1980s and the subsequent

corporate collapses, such as Coloroll, Polly Peck, BCCI and later Barings in the UK (Keasey *et al.*, 2005a; Mallin, 2011; Mallin *et al.*, 2005). These scandals involved the use of creative accounting deterring evident calculation of shareholder value (Whittington, 1993), the weak link between excessive executive pay and corporate performance (Keasey and Wright, 1993), managerial expropriation of stakeholders' funds, the limited role of auditors and the short-term detrimental perspectives of economic performance adopted by the market for control and institutional investors (Keasey *et al.*, 2005a).

Other factors contributing to the increased emphasis on corporate governance issues include the dominant pattern of share ownership by situational investors in the UK; the search for reassurances by institutional investors as a means of protecting their increasingly diversified and overseas investments; the ease facilitated by technological advances with which institutional investors' views can be communicated globally on key aspects of investment such as corporate governance; the key role played by corporate governance in helping diverse businesses to obtain to external funds at the lowest possible cost; and the role played by good corporate governance in creating a more attractive investment environment by providing confidence in a country's stock market (Mallin *et al.*, 2005).

Significant progress had been made in recent years in developing corporate governance codes and principles in several countries. The UK was one of the pioneers in this area (NACD, 2006). The UK concern over corporate governance best practice led to the establishment of the UK's first corporate governance committee, that is, the Cadbury Committee in 1991 (Keasey *et al.*, 2005a) and the publication of the Cadbury Report on the Financial Aspects of Corporate Governance in 1992 (Cadbury, 1992). The Cadbury Report focused on those corporate governance aspects related to financial reporting and accountability (Cadbury, 1992) and relied heavily on "improved information to shareholders, continued self-regulation, more independent directors and a strengthening of auditor independence to improve accountability" (Keasey *et al.*, 2005a: 25).

The Cadbury Report (1992) mainly recommended that companies should appoint at least three independent non-executive directors; separate the roles of chairman and CEO; establish an audit committee composed of at least three independent non-

executive directors and a remuneration committee responsible for recommending directors' remuneration; and consider having a nomination committee for ensuring transparent appointment process. A key feature of the Cadbury Code is directors' independence of management and freedom from any business or other relationship can compromise directors' independent judgment. Moreover, it emphasized the role of institutional shareholders in influencing company-level corporate governance (Keasey *et al.*, 2005a). The corporate governance code was not mandatory but listed companies had to include a statement in their annual report outlining their compliance with the code as well as identifying and giving reasons for non-compliance. Although the Cadbury Report was successful in that its recommendations were generally adopted, such recommendations were criticized for incomprehensiveness of corporate governance standards, detailed prescriptions of corporate governance improvement, additional bureaucracy, too much accountability, ignoring non-financial aspects, and reliance on voluntary compliance of the Cadbury Code (Keasey *et al.*, 2005a).

The Greenbury Report (1995) focused on the determination of executive remuneration. The Greenbury Report's main recommendations re-emphasized the importance of independent non-executive directors, by requiring that remuneration committees consist exclusively of non-executive directors. The report's significant contributions were the provision for comprehensive remuneration-related disclosure and the association of executive remuneration with company performance (Keasey *et al.*, 2005a; Mallin, 2011). Although the Greenbury Report provided a significant development in UK corporate governance structures, its recommendations were criticized for increased bureaucracy and unnecessary burden on companies (Keasey *et al.*, 2005a).

The Hampel Report (1998) reviewed the corporate governance recommendations laid down in both the Cadbury and Greenbury reports. The recommended corporate governance principles concerned directors, directors' remuneration, shareholders, and accountability and audit. The Hampel Report responded to the criticisms of both Cadbury and Greenbury, by placing more emphasis on the balance between business prosperity and accountability rather than on accountability only as well as on principles rather than on prescriptions, thereby reducing the burden on companies (Keasey *et al.*, 2005a).

The Combined Code (1998) was published as a set of principles comprising the Cadbury, Greenbury and Hampel recommendations. Listed companies were required to follow the rule of "comply or explain", where a company should either report on compliance with the code provisions or provide explanations for non-compliance. The Code highlighted the importance of undertaking annual review of all internal controls including financial, operational, compliance controls and risk management. Although the Combined Code emphasized a comprehensive disclosure approach to corporate governance with greater flexibility by allowing for noncompliance by companies where adherence is infeasible or impractical, it may still - like previous reports - be criticized for that many institutional shareholders are applying a form-over-substance approach in handling corporate governance issues (Keasey *et al.*, 2005a).

The Turnbull Report (1999) was concerned with the management of internal controls and risks. It provides guidance for companies' internal control on how to effectively manage risk, rather than to eliminate it. The Turnbull Report emphasized the role of the board of directors in assessing the effectiveness of the internal control system on an annual basis. Although the Turnbull Report attempted to move away from the form-over-substance approach by encouraging companies to provide meaningful information to shareholders for risk assessment, it was criticized for increasing the burdens on companies by placing additional responsibility on the audit committee regarding non-financial risks such as technical, market and environmental risks (Keasey *et al.*, 2005a).

Directors' Remuneration Report Regulations (2002) came into force involving government intervention as opposed to previous self-regulation initiatives, where the framework adopted in the first Combined Code was established by committees largely made up of industrialists and institutions, indicating that self-regulation was unlikely to deliver accountability (Keasey *et al.*, 2005a). These regulations provided for the detailed form and content of the remuneration report. Particularly important, however, is the requirement that shareholders should vote on the directors' remuneration report. Although such voting was advisory in nature, Directors' Remuneration Report Regulations succeeded in increasing shareholder engagement and activism (Keasey *et al.*, 2005a; Mallin, 2011). Moreover, the government issued the *Rewards for Failure* (DTI, 2003); a consultative document on directors' severance payments.

The Myners Review (Myners, 2001) investigated institutional investment issues. The Review set out a set of principles which attempts to codify best practice for pension fund decision making. Although adherence to such principles was not mandatory, but reasons for non-compliance should be explained.

The Smith Report (2003) was issued to review the role of the audit committee and to provide guidelines to help audit committees to increase their effectiveness. The report highlighted the important role played by the audit committee in protecting shareholders' interests regarding financial reporting and internal control.

The Higgs Report (2003) was published as a revision to the principles of the Combined Code. The significant changes recommended by the Higgs Report were mainly concerned with the role and effectiveness of non-executive directors. Additional recommendations included the requirement that at least half of the board, excluding the chairman, should comprise independent non-executive directors; the identification and availability of a senior independent non-executive director for shareholders' contact; the nomination committee should not be chaired by the chairman; a CEO should not become the chairman of the company; in addition to details regarding both board-level and committee-level meetings, appointments and training of independent non-executive directors. The Higgs Report was criticized for "being too prescriptive" and "would threaten board unity and undermine the role of the chairman" (Keasey *et al.*, 2005a: 38-39).

The Combined Code (2003) was issued by the Financial Reporting Council (FRC) in July 2003 incorporating the recommendations of the previous reports. Listed companies were required to follow the rule of "comply or explain", where a company should either report on compliance with the code provisions or provide explanations for non-compliance. The Code's recommendations are divided into two main parts; those for companies and others for institutional shareholders. Recommendations for companies emphasized the roles of the boards and board committees in building sound corporate governance structures. Particularly influential in carrying out these roles is the independence of non-executive directors who should bring their objective judgment to such roles (Mallin, 2011). However, recommendations for institutional shareholders stressed shareholder engagement and activism though shared dialogue with companies and considerable use of their votes. The new Combined Code (2003)

attempted to overcome the criticism of the Higgs Report by reducing the number of code provisions, dropping some of the accused recommendations and relaxing some of the recommendations for smaller companies (Keasey *et al.*, 2005a).

The Combined Code (2006) was issued by the Financial Reporting Council (FRC). This revised code "supersedes and replaces the Combined Code issued in 2003" (Combined Code, 2006: 1). The new version of the Combined Code - as with the previous Combined Codes - requires listed companies to follow the rule of "comply or explain", where a company should either report on compliance with the code provisions or provide explanations for non-compliance. The Combined Code (2006) essentially includes the principles and provisions embedded in the previous code. Limited changes have been made including: allowing the chairman to serve on the remuneration committee given independence on appointment; providing shareholders with the option to withhold their votes on proxy appointment forms; and recommending that companies publish on their websites the details of proxies laid down at general meetings (Mallin, 2011).

The Combined Code (2008) was issued by the Financial Reporting Council (FRC) to promote confidence in corporate reporting and governance. The Code supports the notion that "Good corporate governance should contribute to better company performance by helping a board discharge its duties in the best interests of shareholders" and "should facilitate efficient, effective and entrepreneurial management that can deliver shareholder value over the longer term" (Combined Code, 2008: 1). Changes made to the revised code include dropping the provision restricting a director to chair more than one FTSE 100 companies; and for listed companies outside the FTSE 350, allowing the chairman to serve on the audit committee given independence on appointment (Mallin, 2011).

Finally, the UK Corporate Governance Code (2010) was issued by the Financial Reporting Council (FRC) taking into account the recent significant decline in economic conditions. The new UK Corporate Governance - as with the previous Combined Codes - requires listed companies to follow the rule of "comply or explain", where a company should either report on compliance with the code provisions or provide explanations for non-compliance. The main changes made to the UK Corporate Governance Code (2010) include: annual re-election of all directors

of FTSE 350 companies in order to increase accountability to shareholders; encouraging well-balanced boards where appointments should be based on merit against objective criteria and regard should be given to gender and other diversity; holding regular development reviews by the chairman with each director and externally facilitating board evaluation reviews in FTSE 350 companies at least every three years; explaining the company‘s business model and emphasizing board responsibility for determining the nature and extent of significant risks; aligning performance-related pay to the company's long-term interests, risk policies and systems; and extending the chairman’s responsibilities for ensuring a culture of openness and debate, and adequate time commitment by the non-executive directors.

The development of corporate governance policy in the UK has undergone fundamental changes since the publication of the Cadbury Report. Although the government has issued some consultation documents and reports, the system of corporate governance in the UK is fundamentally self-regulatory. It appears that the approach of “comply or explain” works well for UK companies (Mallin, 2001). However, government intervention indicated that self-regulation was unlikely to deliver accountability and improved corporate governance (Keasey *et al.*, 2005a). The development of codes of corporate governance in the UK can, therefore, be criticized in two respects (Dewing and Russell, 2004). First, the development process has been largely ‘ad hoc’. Second, the codes of corporate governance lack an enforcement mechanism.

The development of corporate governance in the UK has been based on limited UK research evidence regarding the relationship between governance, accountability and enterprise (Keasey *et al.*, 2005a; short *et al.*, 1999). Such research is specially important given that companies have modified their governance structures to comply with best practices recommendations and, hence, the necessity of investigating whether these modifications have led to improvements in accountability, enterprise and performance (Keasey *et al.*, 2005a). Reviewing prior literature would be the next step in order to reveal whether corporate governance has enhanced accountability. Of particular interest to the current research is evaluating the extent to which corporate environmental disclosures, intended to satisfy the information needs of various stakeholders, have become matters of internal corporate governance.

2.4 EXAMINING THE RELATIONSHIP BETWEEN ENVIRONMENTAL DISCLOSURE QUANTITY AND CORPORATE GOVERNANCE

For the purposes of the current study, prior studies examining the quantity of corporate environmental disclosure can be classified into two groups: the impact of corporate characteristics on environmental disclosure quantity and the impact of corporate governance on environmental disclosure quantity. These studies are presented in a chronological order to help trace the gradual evolution and development of any achievements or addition to the existing body of literature.

2.4.1 Impact Of Corporate Characteristics On Corporate Environmental Disclosure Quantity

Trotman and Bradley (1981) suggested some reasons why companies provide social responsibility information and examined the effects of four variables (size, systematic risk, social constraints and management decision horizon) on the social responsibility disclosure practices. The sample used in this study consists of 207 Australian companies. Annual reports were examined and nonparametric statistics were employed including Mann-Whitney *U* test, Chi-Square test and Spearman Rank Correlations. Results indicated that companies which provide social responsibility information are on average larger in size, have a higher systematic risk and place stronger emphasis on the long term than companies which do not disclose this information. In addition, for those companies which disclose social responsibility information, a positive association was found between the amount of social responsibility disclosure and the size of the company, the degree of social constraints faced by the company and the emphasis the company places on the long term in making decisions.

Cowen *et al.* (1987) examined the relationship between a number of corporate characteristics (size, industry, profitability, the presence of a social responsibility committee) and specific types of social responsibility disclosures including environment, energy, fair business practices, human resources, community involvement, product safety and other disclosures. The study was based on a

comprehensive sample of 134 US companies drawn from ten different industries as reported in Ernst & Whinney's 1978 survey of the corporate social responsibility disclosures present in the annual reports of Fortune 500 companies. Both regression and statistics functions were utilized. Corporate size appeared to have a significant impact upon whether environment, energy, fair business practices, community involvement and other disclosures are made, but no influence over human resources or product disclosures. Industry category also appeared to have influenced energy and community involvement disclosures. The existence of a corporate social responsibility committee appeared to correlate with only human resources disclosures. No correlation was found between social responsibility disclosures and profitability.

Freedman and Jaggi (1988) examined whether an association exists between the firm's environmental disclosure and its economic performance, and if such association exists, whether it is affected by the differences in firm's industry and size. The study was carried out on a sample of 108 US firms affected by environmental regulations and belonging to the industries of paper and pulp, oil refining, steel and chemicals. The annual statements and 10 Ks of these companies were examined for 1973 and 1974 and a pollution index was developed to measure the extensiveness of disclosures. Ratios were used as surrogates for economic performance. The association between the two sets of variables was determined on the basis of correlation tests. The results for the total sample indicated that there is no association between the extensiveness of pollution disclosures and economic performance. However, when the sample was segmented by industry group, a significant positive correlation was detected for the oil refining industry. The results showed also that large firms with poor economic performance are likely to provide detailed pollution disclosures. The authors suggested the reason for the relationship may be that information on pollution performance is used to rationalize the relatively poor economic performance resulting from heavy pollution-related expenditures.

Belkaoui and Karpik (1989) developed and empirically tested a positive model of the corporate decision to disclose social information in terms of both social performance and economic performance. Social disclosure was measured using a scale derived from Ernst and Ernst surveys. The independent variables used were social performance (as measured by a reputational index of organizational effectiveness),

economic performance (as measured by return on assets and stock price return), political visibility (as measured by size, capital intensive ratio and systematic risk) and monitoring and contracting cost variables (as measured by leverage and dividends to unrestricted retained earnings). A regression analyses was run for the year 1973 on a sample of 23 US companies. Results suggested the existence of significant and positive association of social disclosure with each of social performance and political visibility as measured by size and systematic risk, while the existence of significant and negative association of social disclosure with financial leverage.

Patten (1991) examined the voluntary social disclosures included by corporations in their annual reports are related to either public pressure on firm profitability. Public pressure was measured using size and industry classification, while firm profitability was measured using return on assets and return on equity. The results of regression analysis on the level of social disclosure for 128 US firms in their 1985 annual reports indicated that size and industry classification are significant explanatory variables whereas profitability variables are not. The author argued that social disclosures are used as a means of addressing the exposure firms face with regard to the social environment and as such should be related more closely with public-pressure variables than profitability measures.

Roberts (1992) used measures of stakeholder power, strategic posture toward social responsibility and economic performance to predict cross sectional variations in corporate social responsibility disclosure. Social disclosure is measured using a disclosure index published by the Council on Economic Priorities (CEP). Stakeholder power is measured by the percentage of outstanding common stock held by management and other shareholders holding 5% or more of the stock, corporate political action committee contributions and the degree to which the corporation relies on debt financing to fund capital projects. Strategic posture is measured using the average number of corporate public affairs staff employed and the corporate sponsorship of a philanthropic foundation. Economic performance is measured using return on equity and systematic risk. Control variables used were company age, industry classification and firm size. A sample of 130 US corporations were investigated in 1984, 1985 and 1986. Results indicated that measures of stakeholder

power, strategic posture and economic performance are significantly related to levels of corporate social disclosure.

Hackston and Milne (1996) empirically investigated the relationship between the level of social and environmental disclosures and a number of corporate characteristics including size, industry and profitability. Content analysis was used to measure the level of social disclosures and an interrogation instrument (including the dimensions of disclosure theme, evidence, news type and amount), checklist and decision rules were developed. Company size is measured using market capitalization, sales and total assets. Profitability is measured by return on assets and return on equity. Industry is measured as a classification into high-profile and low-profile industries. The annual reports of 47 listed New Zealand companies were examined for 1992. Results showed that both size and industry are significantly associated with the amount of disclosure, while profitability is not. In addition, the results indicated that the size-disclosure relationship is much stronger for the high-profile industry companies than for the low-profile industry companies. The study also provided some tentative evidence that dual and multiple overseas listings may be associated with greater social disclosure. Although this study has made some attempts to define the qualitative characteristics of social and environmental disclosures, it did not empirically examined the impact of corporate characteristics on these qualities of disclosure.

Deegan and Gordon (1996) investigated environmental disclosure practices of Australian corporations, their trend across time and whether environmental disclosures are related to environmental groups' concern about particular industries' environmental performance and firm size effects. A sample of 197 Australian firms' annual reports was obtained from the Australian Graduate School of Management (ACSM) annual report file for 1991. The results of the study indicated that: (1) the amount of voluntary environmental disclosures in Australia is typically low, (2) the environmental disclosures are typically self-laudatory, (3) a general increase in environmental disclosures during the period 1988 to 1991. This increase is positively associated with increases in environmental group membership, (4) there is a positive correlation between environmental sensitivity and the level of corporate environmental disclosure, and (5) for firms in environmentally sensitive industries, there is a positive correlation between environmental disclosures and firm size.

Adams *et al.* (1998) identified factors that influence all types of social disclosures. These factors were company size, industrial grouping and country of domicile. A sample of 150 annual reports from six geographically-close and economically-similar European countries (namely France, Germany, The Netherlands, Sweden, Switzerland and the UK) was examined using content analysis. It was found that super large companies are significantly more likely to disclose all types of corporate social information. Industry membership was found to be related to the decision to report environmental and some employee information, but not to ethical disclosures. In addition, while size and industry membership were important in all six countries, the amount and nature of information disclosed varies significantly across Europe.

Gray *et al.* (2001) investigated the relationship between the level of social and environmental disclosures of the top 100 UK companies and a number of corporate characteristics including turnover, capital employed, numbers of employees and profit, over eight years from 1988 to 1995 inclusive. The influence of industry classification on the relationship between social and environmental disclosures and company size and profit is also examined. The data were drawn from the CSEAR (The Centre for Social and Environmental Accounting Research) Social and Environmental Disclosure Database. This database comprises the results of a content analysis of the social and environmental disclosures which are categorized into environmental, employee, community and customer disclosures, and distinguished as being either voluntary or mandatory.

Results of the regression analysis revealed that the relationship between disclosure and corporate characteristics varies according to the type of disclosure being examined. Environmental disclosure was significantly related to capital employed in seven of the eight years studied, to turnover and profit in four of the years examined and to the number of employees in only one year. Voluntary disclosure was significantly related to turnover in seven of the eight years, to capital employed in five years, to number of employees in four years and to profit in only two years. However, mandatory disclosure was significantly related to the number of employees and to the capital employed in only two of the eight years and was not significantly related to turnover in any of the eight years. The results for all forms of disclosure other than consumer provided very strong support that the relationship between social and

environmental disclosures and company size and profit changes from sector to sector highlighting the significant influence of industry affiliation.

Salama (2003) empirically examined the relationship between some corporate characteristics (industry, profitability and size) and environmental disclosures (total disclosures, types of disclosures and areas of disclosure) in major UK companies. A sample of 169 firms was used. The annual reports of companies were content analyzed for the year 1999. Different methodological approaches and statistical analyses were employed. Results indicated that the extent of environmental disclosure in corporate annual reports is generally low or inadequate and that corporate size and industry membership significantly and positively influence environmental reporting practices, while prior profitability negatively influences corporate environmental disclosure in the UK.

García-Ayuso and Larrinaga (2003) examined factors influencing environmental disclosure based on a sample of 112 industrial firms listed on Madrid Stock Exchange. The factors examined are size, risk, profitability, environmental sensitivity, and media exposure. Content analysis was carried out for annual reports filled out between 1991 and 1995. As of the amount of environmental disclosure, empirical results showed that both environmental sensitivity and media coverage have some explanatory power, while size and risk do not seem to explain the cross-sectional differences in the extent of disclosure. However, the decision to disclose environmental information in annual reports was associated with size, risk, sensitivity analysis, and media coverage.

Campbell (2004) investigated voluntary environmental disclosure in UK companies and its relationship to membership of environmental lobbying organizations and environmental sensitivity of the industry. The annual reports of 10 UK-based companies in five sectors of varying degrees of environmental sensitivity were content analyzed between 1974 and 2000. Findings showed an overall increase in disclosure volume over the period but with a marked upturn in the late 1980s. This was regressed against the memberships, over the sane period, of two UK-based environmental lobbying organizations and a strong correlation was found. The use of a "more" and "less" environmentally sensitive measure was used to test for cross-sectional effects and this yielded a positive association between environmental

disclosure and the structural vulnerability of the five sectors to environmental liability and /or criticism. The author suggested that the conclusions allow for the possibility that differentials in the perceived need for social legitimacy may be one cause of both longitudinal and cross-sectional variability in disclosure volumes.

Gao *et al.* (2005) investigated the patterns and determinants of corporate social and environmental disclosure (CSED) in Hong Kong (HK). The amount, content themes and location of CSED were examined through content analysis of 154 annual reports of 33 HK listed companies from 1993 to 1997. Independent variables included size and industry effects. There were five main findings of the study. First, HK companies have increased CSED between the five years examined. Second, size has a positive impact on the level of CSED in HK. Third, the three industry sectors (banking, property, utility) did not differ significantly in the amount of disclosure in a particular location of annual reports and in the amount of disclosure on "Community" and "Fair Business Practices". Fourth, the level of CSED is influenced by industry membership, with utility firms publishing the largest amount of CSED and property firms disclose the least. Finally, HK companies disclosed little information on those themes such as "Environment" and "Health and Safety", which are strongly sensitive to the environment, and no industry disclosed information on the "Energy" theme.

Ho and Taylor (2007) examined the influence of corporate characteristics (size, profitability, industry membership, leverage, and liquidity) and country on triple bottom-line reporting (TBL). Twenty disclosure criteria were developed for each of the TBL disclosure areas: economic, social, and environmental. Disclosure information was examined in annual reports, stand-alone reports, and special website reports. Regression analysis was used to examine empirically the determinants of TBL disclosure practice. The empirical results, based on sample of 50 of the largest US and Japanese companies, showed a positive and significant association between both corporate size and country and TBL disclosure, negative association between corporate profitability, liquidity, and industry membership and TBL reporting, while there is no significant association between leverage and TBL reporting. Further analysis indicated that the results for the total TBL disclosure are primarily driven by non-economic disclosures. In addition, the extent of overall TBL reporting is higher for Japanese firms, with environmental disclosure being the key driver. This result

could be attributed to the differences in national cultures, the regulatory environment, and other institutional factors between the United States and Japan. Despite this study extending the analysis of corporate social and environmental disclosure to other disclosure media over annual reports, it is criticized for using a small sample size.

Branco and Rodrigues (2008) examined the factors influencing social responsibility disclosure (SRD) in both annual reports and web sites for Portuguese listed companies. Social responsibility disclosure referred in this study to disclosures in the following four categories: environmental, human resources, products and consumers and community involvement. They argued that, based on both legitimacy theory and a resource-based perspective, social responsibility disclosure is used by companies as a legitimacy tool to improve corporate image. They examined the following factors: degree of international activity, company size, industry, consumer proximity, environmental sensitivity, and media pressure. Profitability and leverage were used as control variables. The sample of 49 listed companies on the Portuguese Stock Exchange (Euronext – Lisbon) by the end of 2003 was content analyzed. Both the total disclosure level and the disclosure level in each category of social responsibility disclosure were examined separately. The empirical results revealed that only company size and media pressure are significantly associated with social responsibility disclosure, while other variables do not provide an explanation as to the level of such disclosure. Although this study used a clear theoretical framework and added to literature by analyzing both annual reports and internet disclosure, it suffered from a small sample size.

Parsa and Kouhy (2008) noted that the literature was extremely focused on the disclosure of social information by large companies, so they examined the determinants of the disclosure of social information by small-and medium-sized companies in UK. Based on a random sample of 90 UK companies listed on the Alternative Investment Market (AIM), the annual reports for the selected companies were analyzed for three years (2001, 2002 and 2003). They used a correlation test to examine the relation between social reporting and some corporate characteristics. The empirical results indicated that the corporate age is not associated with social reporting, while industrial background, corporate size, and gearing, are associated with the level of such disclosure. These results imply that small-and medium-sized

companies are similar to large companies in the impact of both corporate size and industry membership on social reporting, supporting the view that these companies also treat social reporting as a tool to establish and retain their reputation in an increasingly competitive business environment.

Stanny and Ely (2008) examined factors influencing environmental disclosure about effects of climate change. Institutional investors are asking companies to disclose information about climate change through the Carbon Disclosure Project. They argued that companies that receive more scrutiny will increase their disclosure. Factors examined included corporate size, previous disclosure, industry, foreign sales, asset age, capital expenditure, Tobin's Q, leverage, profitability, and institutional ownership. A sample of US S&P 500 companies, identified in November 2006, was sent a questionnaire in February 2007. The empirical results of binary logit regressions revealed that corporate size, previous disclosure, and foreign sales are significantly associated with disclosure, while no significant association was found between disclosure and institutional ownership, Tobin's Q, profitability, leverage, industry, and asset age.

Liu and Anbumozhi (2009) examined the factors affecting the disclosure level of corporate environmental information in Chinese listed companies on the basis of stakeholder theory. Factors examined were government power, shareholder power and creditor power, while controlling for size, age, location, learning capacity and return on equity. Regression analysis of a sample of 175 companies showed that government power (the environmental sensitivity of industry) is positively related with the level of environmental disclosure, while shareholder power (percent of floating stock possessed by the top 10 shareholders) and creditor power (debt/asset) are not associated with the level of disclosure. Firm's environmental sensitivity and size were found to be the major significant factors influencing their environmental disclosure efforts. The economic performance was not significantly related to the environmental disclosure activities.

Reverte (2009) examined the determinants of corporate social responsibility (CSR) disclosure by Spanish listed companies. Based on a multi-theoretical framework the study examined the impact of corporate size, industry sensitivity, profitability, ownership concentration, international listing, media pressure, and leverage. A sample

of Spanish firms listed on the Madrid Stock Exchange and included in the IBEX35 index was analyzed for the years 2005 and 2006 ending in 46 observations. Data on corporate social responsibility disclosure ratings come from the Observatory on corporate social responsibility (OCSR) focusing on the following three ratings: Total CSR score, CSR Content Rating and CSR Management Systems Rating. The empirical results indicated that corporate size, industry sensitivity, and media pressure are significantly associated with corporate social responsibility disclosure, while both profitability and leverage are not associated with such disclosure. The study implied that legitimacy theory is the most relevant theory to explain the corporate social responsibility disclosure practices of Spanish companies.

Monteiro and Aibar-Guzman (2010) examined the influence of several firm characteristics on the extent of environmental disclosure in the annual reports of large Portuguese companies during the period 2002–2004. Using the content analysis technique, they developed an index in order to assess the presence of the environmental disclosures in companies' annual reports and their breadth. The selected explanatory variables were firm size, industry membership, profitability, quotation on the stock market, foreign ownership and environmental certification. A sample of 109 companies was drawn from the list of the 500 largest Portuguese companies by turnover in 2003. Regression analysis showed that firm size and the fact that a company is listed on the stock market are positively associated with environmental disclosure. However, the results revealed no statistically significant differences between the level of environmental information disclosed by sample firms with a foreign parent company and the domestically owned companies included in the sample. Finally, no significant relationship was found between environmental reporting and the fact that a company has obtained environmental certification.

Table 2.1

Empirical Studies On the Impact Of Corporate Characteristics On Corporate Environmental Disclosure Quantity

Author(s) & Date	Variables			Time of Observation, Sample Size & Sample Type	Analysis &General Result
	Dependent Variable	Independent Variable	Control Variable		
Trotman and Bradley (1981)	The level of social responsibility disclosures	Size, Systematic risk, social pressures, and Management's decision horizon	----------	Time of Observation 1978 Sample Size 207 Australian companies Sample Type The largest companies listed on the Australian Associated Stock Exchange	Analysis 1- Mann-Whitney *U* test 2- Chi-Square test 3- Spearman Rank Correlations General Result Results indicated that companies which provide social responsibility information are on average, larger in size, have a higher systematic risk and place stronger emphasis on the long term than companies which do not disclose this information.
Cowen *et al.* (1987)	Types of social responsibility disclosures	Size, Industry profitability and social responsibility committee	----------	Time of Observation 1978 Sample Size 134 US companies Sample Type Companies drawn from ten different industries as reported in Ernst & Whinney's 1978 survey.	Analysis OLS Regression General Result Corporate size and industry category influenced a number of social responsibility disclosures while the presence of social responsibility committee was found to correlate with only human resources disclosure. No relationship was found between social responsibility disclosures and profitability.
Freedman and Jaggi (1988)	The extent of pollution disclosures	Economic performance	Size and Industry	Time of Observation 1973 and 1974 Sample Size 108 US firms Sample Type Firms affected by environmental regulations and belonging to four highly polluting industries	Analysis 1- Pearson product-moment Correlation 2- Spearman Rank Correlations General Result No significant association was found between extensiveness of pollution disclosures and economic performance except for the oil refining industry where a significant positive correlation was detected. Results also showed that for large firms, a significant negative correlation exists.

Author(s) & Date	Variables			Time of Observation, Sample Size & Sample Type	Analysis &General Result
	Dependent Variable	Independent Variable	Control Variable		
Belkaoui and Karpik (1989)	Social disclosure	Social performance, Economic performance, political visibility (size, capital intensive ratio, systematic risk) and Monitoring & contracting cost variables (leverage and dividends to unrestricted retained earnings)	----------	Time of Observation 1973 Sample Size 23 US companies Sample Type Companies included in both the Ernst & Ernst social disclosure survey and the survey conducted by *Business and Society Revie*.	Analysis OLS Regression General Result Results suggested the existence of significant and positive association of social disclosure with each of social performance and political visibility as measured by size and systematic risk, while the existence of significant and negative association of social disclosure with financial leverage.
Patten (1991)	Social disclosures	Public pressure (as measured by size and industry classification) and Profitability	----------	Time of Observation 1985 Sample Size 128 US companies Sample Type Companies drawn from eight industry classifications in the 1985 Fortune 500 listing	Analysis OLS Regression General Result Results indicated that size and industry classification are significant explanatory variables whereas profitability variables are not.
Roberts (1992)	The level of corporate social disclosure	Stakeholder power, Strategic posture and Economic performance	Company age, Industry classification and Firm size	Time of Observation 1984, 1985, 1986 Sample Size 130 US corporations Sample Type Major companies investigated by CEP drawn from large Fortune 500 companies	Analysis Logistic Regression General Result Results indicated that measures of stakeholder power, strategic posture and economic performance are significantly related to levels of corporate social disclosure.

Author(s) & Date	Variables			Time of Observation, Sample Size & Sample Type	Analysis &General Result
	Dependent Variable	Independent Variable	Control Variable		
Hackston and Milne (1996)	The level of social and environmental disclosure	Size, Industry type and Profitability	----------	Time of Observation 1992 Sample Size 47 New Zealand companies Sample Type Top 50 companies listed in New Zealand Stock Exchange based on a size ranking of market capitalization	Analysis 1- Pearson correlations 2- Spearman's rank correlations 3- OLS Regression General Result Results showed that both size and industry are significantly associated with the amount of disclosure, while profitability is not.
Deegan and Gordon (1996)	The level of corporate environmental disclosure	Environmental group membership, Environmental sensitivity and Firm size	----------	Time of Observation 1991 Sample Size 197 Australian companies Sample Type Firms filed with the Australian Graduate School of Management (AGSM)	Analysis 1- Pearson product-moment Correlations 2- Spearman rank correlations General Result The amount of voluntary environmental disclosure was found to be low in Australia but increases over time. A significant positive association was found between environmental disclosures and each of environmental group membership, environmental sensitivity of the industry and firm size.
Adams *et al.* (1998)	Types of social disclosures	Company size, Industry grouping and country of domicile	----------	Time of Observation 1992 Sample Size 150 European companies Sample Type The largest 25 companies in each of six Western European countries	Analysis ANOVA tests General Result Results indicated that company size is significantly associated with all types of social disclosures, while industry membership was found to be related to environmental and some employee disclosures only. In addition, the amount and nature of social information disclosed varied significantly across countries.

Author(s) & Date	Variables			Time of Observation, Sample Size & Sample Type	Analysis &General Result
	Dependent Variable	Independent Variable	Control Variable		
Gray *et al*. (2001)	Total social disclosure, Major areas of social disclosure and types of social disclosure	Turnover, Capital employed, Number of employees and Profit	Industry classification	Time of Observation 1988 – 1995 inclusive Sample Size 100 UK companies Sample Type Top 100 UK companies selected from the *Times 1000*	Analysis OLS Regression General Result The results provided strong support that in the UK, corporate social and environmental disclosure is related to corporate characteristics of size, profit and industry affiliation.
Salama (2003)	Total environmental disclosure, Types of environmental disclosure and Areas of environmental disclosure	Industry, profitability and size	----------	Time of Observation 1999 Sample Size 169 UK firms Sample Type The largest 200 UK companies by market capitalization	Analysis 1- OLS Regression 2- TOBIT Regression 3- LOGIT Regression 4- Ordered PROBIT Regression General Result Results indicated that corporate size and industry membership significantly and positively influence environmental reporting practices, while prior profitability negatively influences corporate environmental disclosure in the UK.
García-Ayuso and Larrinaga (2003)	The level of corporate environmental disclosure	Size, risk, profitability, environmental sensitivity, and media exposure	----------	Time of Observation 1991 - 1995 Sample Size 112 Spanish firms Sample Type Companies listed in Madrid Stock Exchange	Analysis 1- Spearman's rank correlations 2- OLS Regression General Result As of the amount of environmental disclosure, empirical results showed that both environmental sensitivity and media coverage have some explanatory power, while size and risk do not seem to explain the cross-sectional differences in the extent of disclosure.

Author(s) & Date	Variables			Time of Observation, Sample Size & Sample Type	Analysis &General Result
	Dependent Variable	Independent Variable	Control Variable		
Campbell (2004)	The volume of environmental disclosure	Membership of environmental lobbying organizations and Environmental sensitivity of the industry	----------	Time of Observation 1974 - 2000 Sample Size 10 UK companies Sample Type Two companies from five sectors chosen from the FTSE 100 (by market value)	Analysis 1- *t* - tests 2- OLS Regression General Result Results indicated an increase in the volume of voluntary environmental disclosure over 27 years, and a strong correlation of that disclosure to membership of environmental lobby groups. Also, a significant positive association was found between environmental disclosure and the environmental sensitivity of the industry.
Gao *et al*. (2005)	The amount, content themes and location of Corporate Social and Environmental Disclosure (CSED)	Size and Industry effects	----------	Time of Observation 1993 - 1997 Sample Size 33 Hong Kong companies Sample Type The Top 100 companies listed on Hong Kong Stock Exchange	Analysis 1- Pearson Correlations 2- ANOVA tests General Result The study found that industry difference has an impact on the amount, content themes and location of CSED and there is a positive correlation between company size and the level of CSED.
Ho and Taylor (2007)	The extent of triple bottom-line reporting (TBL)	Size, profitability, industry membership, leverage, and liquidity	----------	Time of Observation 2003 Sample Size 50 US and Japanese companies Sample Type The largest 50 US and Japanese companies by market capitalization	Analysis OLS Regression General Result Results indicated that for total TBL disclosure (combining economic, social, and environmental categories), the extent of reporting is higher for firms with larger size, lower profitability, lower liquidity, and for firms with membership in the manufacturing industry.

Author(s) & Date	Variables			Time of Observation, Sample Size & Sample Type	Analysis &General Result
	Dependent Variable	Independent Variable	Control Variable		
Branco and Rodrigues (2008)	The level of social responsibility Disclosure(SRD) and Types of social responsibility disclosure	Degree of international activity, company size, industry, consumer proximity, environmental sensitivity, and media pressure	Profitability and leverage	Time of Observation 2003 Sample Size 49 Portuguese companies Sample Type Companies listed in Portuguese Stock Exchange (Euronext – Lisbon)	Analysis 1- *t* - tests 2- Wilcoxon test 3- OLS Regression General Result Empirical results revealed that only company size and media pressure are significantly associated with social responsibility disclosure, while other variables do not provide an explanation as to the level of such disclosure.
Parsa and Kouhy (2008)	The level of social reporting	Corporate age, industrial background, corporate size, and gearing	----------	Time of Observation 2001-2003 Sample Size 90 UK companies Sample Type Random sample of companies listed on the Alternative Investment Market (AIM)	Analysis 1- Spearman's rank correlations 2- Kruskal–Wallis test General Result Results indicated that the corporate age is not associated with social reporting, while industrial background, corporate size, and gearing, are associated with the level of such disclosure.
Stanny and Ely (2008)	The level of environmental disclosure	Corporate size, previous disclosure, industry, foreign sales, asset age, capital expenditure, Tobin's Q, leverage, profitability, and institutional ownership	----------	Time of Observation 2007 Sample Size 500 US companies Sample Type US S&P companies	Analysis 1- Tetrachoric correlation 2- Pearson correlation 3- LOGIT Regression General Result The empirical results of binary logit regressions revealed that corporate size, previous disclosure, and foreign sales are significantly associated with disclosure, while no significant association was found between disclosure and institutional ownership, Tobin's Q, profitability, leverage, industry, and asset age.

Author(s) & Date	Variables			Time of Observation, Sample Size & Sample Type	Analysis &General Result
	Dependent Variable	Independent Variable	Control Variable		
Liu and Anbumozhi (2009)	The level of environmental disclosure	Government power (environmental sensitivity of industry), shareholder power (percent of floating stock possessed by the top 10 shareholders) and creditor pressure (debt/asset)	Size, age, location, learning capacity and return on equity	Time of Observation 2006 Sample Size 175 Chinese companies Sample Type Chinese listed companies	Analysis 1- Pearson correlation 2- OLS Regression General Result Firm's environmental sensitivity (government power)and size were found to be the major significant factors influencing their environmental disclosure efforts. The economic performance was not significantly related to the environmental disclosure activities. Shareholder power and creditor pressure showed no significant association.
Reverte (2009)	Corporate social responsibility (CSR) disclosure	Corporate size, industry sensitivity, profitability, ownership concentration, international listing, media pressure and leverage	----------	Time of Observation 2005-2006 Sample Size 46 Spanish companies Sample Type Spanish firms listed on the Madrid Stock Exchange and included in the IBEX35 index	Analysis 1- Correlation 2- OLS Regression General Result Results indicated that corporate size, industry sensitivity, and media pressure are significantly associated with corporate social responsibility disclosure, while both profitability and leverage are not associated with such disclosure.
Monteiro and Aibar-Guzman (2010)	The level of environmental disclosure	Firm size, industry membership, profitability, quotation on the stock market, foreign ownership and environmental certification	----------	Time of Observation 2003 Sample Size 109 Portuguese companies Sample Type Companies drawn from the list of the 500 largest Portuguese companies by turnover in 2003	Analysis 1- Pearson correlation 2- OLS Regression General Result Results showed that firm size and the fact that a company is listed on the stock market are positively associated with environmental disclosure.

2.4.2 Impact Of Corporate Governance On Corporate Environmental Disclosure Quantity

Halme and Huse (1997) examined the relations between corporate environmental reporting in annual reports and corporate governance variables, industry variables and country variables. Empirical evidence is gathered from large corporations in Finland, Norway, Spain and Sweden, a sample of 40 companies from each of the Scandinavian countries (except for Spain where only 20 Spanish firms where included in the sample). The annual reports for 1992 were content analyzed to explore the environmental reporting variables. The environmental disclosures were examined with the help of a three-class categorization in annual reports: little or no environmental information; a separate environmental section; and a separate environmental section together with an environmental policy and future action plans. Corporate governance variables identified by the study are ownership concentration and the number of board members.

Results of the logistic regression analyses indicated that the extent of a corporation's environmental impact is positively related to environmental reporting. Industry appeared to be the most important factor in explaining environmental disclosure in annual reports. Corporations in industries which are traditionally considered to be polluting, reported most on the environment. Although the number of board members were positively related to corporate environmental reporting in some of the analyses, the number of board members varied considerably among the four countries studied, and the effect mentioned seemed to depend on variations between the countries. The overall research results did not indicate any significant relationship with ownership concentration or the number of board members. Similarly, Norwegian firms seemed more likely than firms in the other countries to have some environmental reporting. This may be related to the Norwegian legislation and tougher legal requirements imposed on Norwegian companies. However, after adjusting for industry and corporate governance variables, there were differences between the environmental reporting by corporations in the three Nordic countries, where Finnish companies showed less attention to the environment than their Norwegian and Swedish counterparts.

McKendall *et al.* (1999) examined the effects of corporate governance structures on the incidence of corporate illegality by analyzing the relationship between environmental violations and several dimensions of corporate board structure. Environmental violations, which include non-disclosure of corporate environmental information, were categorized as serious violations and non-serious violations. Corporate governance dimensions examined include outsider dominance, dual CEO-Chairperson roles, stock ownership by officers and directors, social responsibility committees and attorneys on boards. The study also controlled for the following variables: industry profitability, firm profitability, organization size and industry concentration. Based on a sample of 150 US companies extracted from the 1000 largest business firms listed in Ward's Business Directory, Tobit regressions were carried out. The sample companies were examined for 1985, 1986, and 1987. Results demonstrated that the value of stock owned by corporate officers and directors was positively and significantly associated with serious environmental violations. Outsider dominance, joint CEO-Chairpersons, social responsibility committees and attorneys on boards were not significantly related to environmental violations. These findings cast proposals. The control variables of size, industry profitability, firm profitability and industry concentration were all significantly and mostly negatively related to environmental violations including the non-disclosure of environmental information. These findings are consistent of most previous research suggesting a significant and positive correlation between such control variables and the disclosure of environmental information.

Haniffa and Cooke (2002) examined the relationship between a number of corporate governance, cultural and firm-specific characteristics and the extent (range and scope) of voluntary disclosure in the annual reports of Malaysian companies. The survey covered 167 companies that published their annual reports during the year ended 31 December 1995. Voluntary disclosure is measured by an index of disclosure. Three corporate governance variables were found to be significant are independent non-executive director, chairperson and the proportion of family members on the board, but the relationship is negative. However, none of the cultural variables were found to be significant. Out of seventeen firm-specific variables used as control variables in the model, four were found to be significant and positively related to disclosure. These

are assets-in-place, ownership structure based on the proportion of shares held by top ten shareholders, foreign ownership and profitability.

Chau and Gray (2002) examined the association of ownership structure with the voluntary disclosures – including environmental disclosures – of listed companies in Asian settings of Hong Kong and Singapore. The sample selected comprises only industrial companies including food & beverages, shipping & transportation, publishing & printing, electronics & technology, building materials & construction. Annual reports for 1997 were analyzed for a random sample of 60 Hong Kong companies and 62 Singapore companies. A voluntary disclosure checklist was developed and a voluntary disclosure index was calculated as the number of total voluntary disclosures divided by the maximum voluntary disclosure possible. The ownership variable was calculated by adding together the proportions of equity belonging to directors and to dominant shareholders to arrive at the proportion of firm's equity owned by insiders. This figure was then used to derive the proportion of a firm's equity owned by outsiders.

A linear multiple regression analysis was used to test the association between the dependent variable of voluntary disclosure and the independent variable of ownership structure. In addition to ownership structure, a number of control variables such as firm size, leverage, size of auditors, profitability and multinationality, were also included in the analysis. Results showed that the extent of outside ownership is positively associated with voluntary disclosures – including environmental disclosures. In particular, the results also indicated that the level of information disclosure is likely to be less in insider of family-controlled companies, a significant feature of the Hong and Singapore stock markets.

Gul and Leung (2004) examined the linkages between board outside directors on the board and voluntary corporate disclosures. The dependent variable, voluntary disclosures included environmental information items such as environmental measures and ISO or other awards. A disclosure index consisting of 44 discretionary items was developed to measure voluntary disclosures. Regression analyses of observations from 385 Hong Kong listed companies were carried out for 1996. Several control variables were added to the analyses including firm size, leverage, liquidity, profitability, auditor firm, audit committee, firm growth, listing status,

consolidated firms, equity, loss, equity market liquidity and finally industry type. Results showed that the extent to which managers will disclose more corporate information is likely to be affected by the composition and quality of the board of directors. More specifically, CEO duality was associated with lower voluntary disclosures, supporting the view that the position of chairman and CEO should be separated. Results also revealed that firms with a higher proportion of expert outside directors are associated with lower voluntary disclosures. More interestingly, it was found that the negative association between CEO duality and corporate disclosures is weaker when the firm has a higher proportion of expert outside directors suggesting that the expertise of non- executive directors moderates the CEO duality/corporate disclosures relationship. The disclosure levels were also positively correlated with firm size, profitability, the presence of audit committee, firm growth, listing status and equity financing and negatively associated with the proportion of shares held by directors and liquidity.

Haniffa and Cooke (2005) examined whether the extent of Corporate Social Disclosure (CSD) in the annual reports of Malaysian listed companies changes over time and whether there is an association with three groups of variables: cultural, corporate governance and firm-specific (control) variables. Content analysis was adopted to achieve the objectives. A final sample of 139 companies listed in KLSE was examined in 1996 and in 2002. Descriptive analysis and parametric and non-parametric tests indicated significant differences in the extent and variety of CSD for the two years despite minimal legislative guidance for such disclosures. Two different dependent variables were used in the regression models: CSDI (index) and CSDL (length) representing the variety and the extent of CSD respectively. The significant positive relationship between Malay directors and Malay shareholders with CSD practice in the annual reports of Malaysian companies suggests that disclosure cannot be culture free and is attributed primarily to government policy. Results also indicated a significant negative relationship between the composition of non-executive directors and CSD while a significant positive relationship between chairs with multiple directorships and CSD. Foreign share ownership was found to be statistically significant based on CSDI but not when the dependent variable is CSDL. In addition, size, profitability and multiple listings were all statistically related to CSD. The

industry-CSD relationship seemed to be less significant with the interaction of other variables. Similarly, gearing as proxy for risk did not seem to impact CSD.

Barako *et al.* (2006) investigated the extent to which corporate governance attributes, ownership structure and company characteristics influence voluntary disclosure practices including environmental disclosure. The sample consisted of all Kenyan companies (54) listed on Nairobi Stock Exchange (NSE), which were examined from 1992 to 2001. A disclosure index was used to measure the level of voluntary reporting by companies. Corporate governance characteristics examined in this study are: board composition, board leadership structure and audit committee formation. Results suggested that the extent of voluntary disclosure (including environmental disclosure) is influenced by a firm's corporate governance attributes, ownership structure and company characteristics. The presence of an audit committee was found to be a significant factor that is positively associated with the level of voluntary disclosure and the proportion of non-executive directors on the board was found to be significantly and negatively associated with the extent of voluntary disclosure. The study also found that the levels of institutional and foreign ownership have a significantly positive impact on voluntary disclosure. Large companies and companies with high debt voluntarily disclosed more information. In contrast, board leadership structure, liquidity, profitability and type of external audit firm did not have a significant influence on the level of voluntary disclosure by companies in Kenya.

Naser *et al.* (2006) examined factors influencing corporate social disclosure (CSD) in Qatar. They investigated the effect of firm size as measured by the firm's market capitalization and business risk as measured by the leverage and corporate growth, as well as ownership variables (government ownership, institutional ownership, and major shareholders). Content analysis was employed in the study and a checklist was developed including 15 content categories within four testable dimensions: theme, evidence, amount and location. The annual reports of a sample of 21 Qatari companies listed on the Doha Stock Exchange was analyzed for the year 1999/2000. Variations in corporate social disclosure by the sample of Qatari companies were found to be associated with the firm size as measured by the firm's market capitalization and business risk as measured by the leverage and corporate growth. However, the proportion of the institutional investors, dispersion of individual

investors and government ownership proved to have little impact on the level of CSD by the sample of Qatari companies.

Ghazali (2007) examined the influence of ownership structure on corporate social responsibility (CSR) disclosure in Malaysian company annual reports. The factors examined include ownership concentration, director ownership, government ownership, company size, profitability and industry. A sample of 87 non-financial companies included in the Bursa Malaysia Composite Index was selected. The annual reports for the financial year 2001 were analyzed using a CSR disclosure checklist to measure the extent of CSR disclosure. Results from multiple regression analysis showed that two ownership variables, director ownership and the government as a substantial shareholder, which are common business attributes in Malaysia, have significant influence on CSR disclosure in annual reports. However the third ownership variable, ownership by the ten largest shareholders, was not statistically significant in explaining the level of CSR disclosure in annual reports. Both profitability and industry were not significant factors in explaining CSD.

Hossain and Reaz (2007) examined the association between company specific characteristics and voluntary disclosure by 38 listed banking companies in India. Corporate social - and hence environmental - disclosure represented one category of voluntary disclosure. The empirical investigation revealed that corporate size and assets in-place are significantly associated with disclosure, while corporate age, multiple exchange listing, business complexity, and board composition (percentage of non-executive directors) are insignificant in explaining the level of disclosure. This study is criticized for the use of a single year and one specific industry sector. In addition, it examined the total level of disclosure as opposed to the level of disclosure within each disclosure category.

Huafang and Jianguo (2007) examined the impact of ownership structure and board composition on voluntary disclosures (including environmental disclosures) of listed companies in China. A disclosure index was developed where the score equals the total number of points awarded for voluntary disclosure of strategic, business, financial and non-financial information. Ownership structure variables included blockholder, managerial, state, legal-person and foreign listing/shares ownership. Board composition variables included the proportion of independent directors and

CEO duality. Control variables included firm size, leverage, firm growth and auditor reputation. A sample of 559 firms covering 11 industry sectors was drawn from firms listed on Shanghai Stock Exchange (SSE) in 2002. Results of the regression analysis revealed that higher blockholder ownership and foreign listing/shares ownership are associated with increased disclosure. However, managerial ownership, state ownership and legal person ownership are not related to disclosure. An increase in independent directors increased corporate disclosure and CEO duality was associated with lower disclosure. The study also found that larger firms have greater disclosure, while firms with growth opportunities are reluctant to disclose information voluntarily. However, no significant relationship was found between voluntary disclosure and each of auditor reputation and leverage.

Lim *et al.* (2007) examined the association between board composition and voluntary disclosure in the annual reports of 181 Australian companies. They developed a checklist of 67 voluntary items being classified as: strategic, non financial and financial information. The non financial information category is that of social and environmental disclosure, which has been examined separately. A two-stage multivariate analysis was used to deal with the problem of endogeneity. In the first stage they estimated the relation between the ratio of independent directors to total board size and firm characteristics that may be related to voluntary disclosure. In the second stage they investigated the effect of board composition, captured by the fitted values from the first stage, on the extent of voluntary disclosure. The results indicated a positive association between board composition and total voluntary disclosure. Furthermore, the results indicated that (a) boards composed largely of independent directors voluntarily disclose more forward looking quantitative and strategic information and (b) board structure has no bearing on non-financial and financial voluntary disclosure. Other drivers of voluntary disclosure of information in companies' annual reports were firm size, shareholder concentration, industry classification, management compensation and investment growth set.

Rizk *et al.* (2008) used a sample of 60 Egyptian manufacturing companies to address the social and environmental reporting practices in the corporate annual report for the financial year 2002. They employed an un-weighted disclosure index consisting of 34 information items covering environmental, energy, human resources, customer and

community involvement issues. The impact of private ownership, government ownership and industry membership on corporate social and environmental reporting were examined. A random sample of Egyptian companies in the industrial sector were selected from nine high polluting industries including food, beverage and tobacco, ceramics, chemicals, cement, pharmaceuticals, building materials and construction, textiles, and mills and storage. Non-parametric tests, i.e. ANOVA tests, were used to test the developed hypotheses.

The study concluded that the extent of corporate social responsibility is low. In addition, the nature of disclosures was found to be overwhelmingly descriptive. Findings indicated that industry membership is a statistically significant factor relative to the category of disclosure. In addition, government owned companies disclose more employee related information than private companies. On the other hand private companies were found to disclose customer related, environment related, and community related information more than governmental owned companies. However, the study focused on the legal form of the company rather than the ownership percentages. The study recommended the use of a reasonably large sample that covers both the industrial and non-industrial sectors as well as a longitudinal analysis of the sample companies.

Al Arussi *et al.* (2009) investigated the relationship between the extent of voluntary financial and environmental disclosures on the internet and each of ethnicity of CEO, leverage, level of technology, existence of dominant personalities, profitability and firm size. A sample of 201 Malaysian listed companies on the Bursa Malaysia's Main and Second Boards was analyzed for the financial year 2005. The sample was selected using the disproportionate stratified random sampling approach. Multivariate tests and linear regression analysis were undertaken to examine the hypotheses. The results indicated that level of technology, ethnicity of CEO and firm size are determinants of both internet financial and environmental disclosures. However, the existence of a dominant personality was found to negatively affect the level of financial disclosures but not environmental disclosures. Yet leverage and profitability did not show any significant relationship with either financial or environmental disclosures.

Grüning and Bergerernst (2010) examined the association of disclosure and corporate governance for a sample of 6,580 firms listed in the US between 2003 and 2007.

Disclosure is measured by an innovative artificial intelligence approach in ten distinctive information dimensions (financial, customers, value chain, employees, R&D, strategy, governance, stock market, environment, society) and corporate governance is measured by an aggregate index of 48 variables in 8 categories (board, audit, charter/bylaws, state of incorporation, ownership, executive and director compensation, progressive practices, director education). Several control variables were used including: size, ownership concentration, equity ratio, age, growth rate, leverage, capital intensity, loss, intangible assets, stock return, stock return volatility, issuer firm, type of auditor, market-to-book ratio, stock turnover, Tobin's Q, previous year disclosure and previous year corporate governance. Results indicated that well-governed firms opt into a more comprehensive disclosure policy and provide a higher degree of disclosure. Yet, this relation is not homogenous across all corporate governance dimensions. For the categories audit, state of incorporation, ownership and progressive practices, a strong positive effect on corporate governance was detected, whereas for the director and executive compensation category revealed a negative effect. In a 3SLS modeling, corporate governance and disclosure were found to positively interact in increasing firm valuation in terms of Tobin's q. In general, a complementary relationship between disclosure and corporate governance structure, was documented but evidence has been provided that this relationship varies across different corporate governance dimensions.

Michelon and Parbonetti (2010) investigated the effects of corporate governance, as being represented by three board characteristics (i.e. leadership, structure and composition) on sustainability disclosure, while controlling for some company-specific characteristics. Sustainability disclosure was determined using content analysis of annual, sustainability, social and environmental reports of year 2003 of a sample of 114 European and American companies: 57 are listed in the Dow Jones Sustainability Index and the remaining 57 belong to the Dow Jones between the proportion of independent directors and the quantity of sustainability information disclosed as well as between CEO duality and the level of sustainability disclosure. In addition, the relationship between the presence of a CSR committee or responsible and the level of disclosure is not confirmed by empirical evidence. However, a positive association was found between community influential and sustainability

disclosure. Accordingly, the study partially supports the idea that a sound governance increases voluntary disclosure.

Peters and Romi (2011) examined the determinants of the voluntary reporting of greenhouse gas (GHG) emission accounting information. The two main variables of interest used in evaluating the relationship between corporate governance and GHG disclosures were the existence of an environmental committee on the board and a sustainability officer. However, further analysis employed additional variables: environmental committee size, diligence, expertise, and knowledge spillover as well as sustainability officer expertise. Several firm characteristics were controlled for including: environmental performance, cumulative number of previous disclosures, cross listing, inclusion on sustainability indices, oil industry, paper industry, petroleum industry, chemical industry, metals industry, CEO duality, institutional ownership, profitability, size, growth and leverage. GHG accounting disclosures were captured from the Carbon Disclosure Project's (CDP) GHG Emissions Questionnaire.

Using a sample of firms participating in the Carbon Disclosure Project (including all US firms in the FT500) from 2002 through 2006, a strong relationship between sustainability-oriented corporate governance characteristics and the voluntary disclosure of GHG information was documented. Specifically, the study found that GHG emission accounting disclosures are positively associated with the presence of environmental committees on boards of directors and corporate sustainability officers. Further analysis of specific committee and executive characteristics revealed that the size and diligence of the environmental committee and expertise of the sustainability officer are positively related to voluntary disclosure. Committee members with expertise in environmental sustainability were positively associated with disclosure. Finally, knowledge spillover from overlap between environmental committees and audit committees was found to significantly increase the likelihood of GHG emission accounting disclosures.

Post *et al.* (2011) evaluated the relationship between boards of directors' composition and environmental corporate social responsibility (ECSR). ECSR was measured in two different ways. First, ECSR disclosures were used as reported in firms' annual reports, corporate environmental reports, corporate websites, and government

websites. ECSR disclosure measure comprised 26 items grouped into 3 categories: governance data, credibility data and environmental performance indicators. Second, data from the proprietary KLD STATS database, issued by Kinder, Lydenberg, Domini, Inc. (KLD) that provides annual ratings of the environmental, social and governance actions of more than 3,000 publicly traded companies. KLD measures firms' environmental actions in seven areas of strengths (beneficial products and services, pollution prevention, recycling, clean energy, communications, management systems, and other strengths) and in seven areas of concern (hazardous waste, regulatory problems, ozone depleting chemicals, substantial emissions, agricultural chemicals, climate change, and other areas of concern). Three KLD measures employed in the analyses are: KLD strengths, KLD concerns and Total KLD (the difference between strengths and concerns).

Corporate governance characteristics examined are directors' insider/outsider status, gender, age, and education, while controlling for industry, slack resources and CEO duality. Using a sample of 78 Fortune 1000 companies (consisting of the electronics firms found in the 2006 list of Fortune 1000 companies and the chemical firms found in the 2007 list of Fortune 1000 companies), the study found that a higher proportion of outside board directors is associated with more favorable ECSR disclosures and higher KLD strengths scores. Firms with boards composed of three or more female directors received higher KLD strengths scores. In addition, boards whose directors average closer to 56 years in age and those with a higher proportion of directors with Western European education were more likely to implement environmental governance structures or processes.

Table 2.2

Empirical Studies On the Impact Of Corporate Governance On Corporate Environmental Disclosure Quantity

Author(s) & Date	Variables			Time of Observation, Sample Size & Sample Type	Analysis &General Result
	Dependent Variable	Independent Variable	Control Variable		
Halme and Huse (1997)	The extent of corporate environmental reporting	Ownership concentration, Board size, Industry and Country.	----------	Time of Observation 1992 Sample Size 40 companies from each of Finland, Norway and Sweden and 20 companies from Spain. Sample Type The largest corporations from each of the Scandinavian countries	Analysis Logistic Regression General Result Results indicated that the extent of a corporation's environmental impact is positively related to environmental reporting. Significant positive correlation was found between industry and environmental reporting with corporations in polluting industries reported most on the environment. However, overall research results did not indicate any significant relationship with ownership concentration or the number of board members.
McKendall *et al*. (1999)	Environmental violations including non-disclosure of environmental information	Outsider dominance, Dual CEO-Chairperson roles, Stock ownership by officers and directors, Social responsibility committees and Attorneys on boards.	Industry profitability, Firm profitability, Organization size and Industry concentration.	Time of Observation 1985, 1986, 1987 Sample Size 150 US companies Sample Type The largest companies from the 1000 largest business firms listed in Ward's Business Directory	Analysis TOBIT Regression General Result Results demonstrated that the value of stock owned by corporate officers and directors was positively and significantly associated with serious environmental violations. Outsider dominance, joint CEO-Chairpersons, social responsibility committees and attorneys on boards were not significantly related to environmental violations. Finally, size, industry profitability, firm profitability and industry concentration were all significantly and mostly negatively related to environmental violations including the non-disclosure of environmental information.

Author(s) & Date	Variables			Time of Observation, Sample Size & Sample Type	Analysis &General Result
	Dependent Variable	Independent Variable	Control Variable		
Haniffa and Cooke (2002)	The extent of voluntary disclosure including environmental disclosure	Corporate characteristics: Size, Assets-in-place, Industry type, Listing age, Complexity of business, Level of diversification, Multiple listing status, Foreign activities, Gearing. Ownership structure: Top ten shareholders, Foreign ownership, Institutional investors, Profitability, Type of auditors. Corporate governance characteristics: Board composition, Cross directorships, Role duality, Family members on the board, Finance director on the board, Chairman with cross-directorships, Chairperson is non-executive director. Personal characteristics: Race of chairperson, Race of managing director, Race of finance director, Racial ownership structure, Racial composition of directors on board, Qualification of directors, Qualification of finance director.	----------	Time of Observation 1995 Sample Size 167 Malaysian companies Sample Type Companies listed in Kuala Lumpur Stock Exchange (KLSE)	Analysis OLS Regression General Result Three corporate governance variables were found to be significant are independent non-executive director, chairperson and the proportion of family members on the board, but the relationship is negative. None of the cultural variables were found to be significant. However, four firm-specific variables were found to be significant and positively related to disclosure. These are assets-in-place, ownership structure based on the proportion of shares held by top ten shareholders, foreign ownership and profitability.

Author(s) & Date	Variables			Time of Observation, Sample Size & Sample Type	Analysis &General Result
	Dependent Variable	Independent Variable	Control Variable		
Chau and Gray (2002)	The extent of voluntary disclosure including environmental disclosure	Ownership structure	Firm size, leverage, size of auditors, profitability and multinationality	Time of Observation 1997 Sample Size 60 Hong Kong companies and 62 Singapore companies Sample Type Random sample of industrial companies listed on each of Hong Kong and Singapore Stock Exchanges	Analysis OLS Regression General Result Results showed that the extent of outside ownership is positively associated with voluntary disclosures – including environmental disclosures.
Gul and Leung (2004)	Voluntary corporate disclosures including environmental disclosures	CEO duality and Proportion of expert outside directors on the board	Firm size, Leverage, Liquidity, Profitability, Auditor firm, Audit committee, Firm growth, Listing status, Consolidated firms, Equity, Loss, Equity market liquidity and Industry type.	Time of Observation 1996 Sample Size 385 Hong Kong companies Sample Type All companies listed in Hong Kong Stock Exchange	Analysis 1- t-tests 2- Wilcoxon tests 3- Pearson correlations 4- 2SLS (Two-Stage Least Squares) Regression General Result CEO duality was associated with lower voluntary disclosures and a higher proportion of expert outside directors was associated with lower voluntary disclosures. CEO duality /voluntary disclosure was weaker for firms with higher proportion of expert outside directors. Disclosure levels were also positively correlated with firm size, profitability, the presence of audit committee, firm growth, listing status and equity financing and negatively associated with the proportion of shares held by directors and liquidity.

Author(s) & Date	Variables			Time of Observation, Sample Size & Sample Type	Analysis &General Result
	Dependent Variable	Independent Variable	Control Variable		
Haniffa and Cooke (2005)	The variety and extent of corporate social disclosure(CSDI and CSDL respectively)	Malay dominated board of directors, a Malay finance director, Malay dominated shareholders, Composition of non-executive directors, Chairperson with multiple directorships, Ownership by foreign shareholders, Size, Profitability, Gearing, Multiple listing and Industry type.	----------	Time of Observation 1996 & 2002 Sample Size 139 Malaysian companies Sample Type All companies listed in Kuala Lumpur Stock Exchange (KLSE)	Analysis 1 *t*-test 2- Wilcoxon test 3- OLS Regression General Result Results suggested a significant positive relationship between Malay directors and Malay shareholders with CSD while no relationship existed between a Malay finance director & CSD. CSD was also found to have a significant negative relationship with non-executive directors and a significant positive relationship with chairs of multiple directorships. Foreign share ownership was found to be statistically significant based on CSDI but not when the dependent variable is CSDL. Concerning firm-specific characteristics, size, profitability and multiple listings were all statistically related to CSD, while industry type and gearing did not seem to impact CSD.
Barako *et al*. (2006)	The level of voluntary disclosure including environmental disclosure	Board composition, Board leadership structure, Board audit committee, shareholder concentration, Foreign ownership, Institutional ownership, Firm size, leverage, External auditor firm, Profitability and Liquidity.	Industry type	Time of Observation 1992 – 2001 Sample Size 54 Kenyan companies Sample Type All companies listed in Nairobi stock Exchange (NSE)	Analysis 1- Pearson correlation 2- Ordinary Least Square (OLS) Regression with Panel-Corrected Standard Errors ($PCSE_S$) General Result Results indicated that audit committee is positively associated with voluntary disclosure and board composition is negatively associated with voluntary disclosure, while board leadership structure is not. Institutional shareholding and foreign ownership were found to be positively related with the extent of voluntary disclosures. Size and leverage were significantly and positively associated with voluntary disclosure practices, while liquidity, profitability and type of external audit firm were not.

Author(s) & Date	Variables			Time of Observation, Sample Size & Sample Type	Analysis &General Result
	Dependent Variable	Independent Variable	Control Variable		
Naser *et al*. (2006)	The level of corporate social disclosure (CSD)	Firm size (market capitalization), business risk (leverage and corporate growth) and ownership variables (government ownership, institutional ownership, and major shareholders)	----------	Time of Observation 1999/2000 Sample Size 21 Qatari companies listed on the Doha Stock Exchange Sample Type Companies listed on the Doha Stock Exchange	Analysis 1- Pearson correlation 2- OLS Regression General Result CSD was found to be associated with the firm size as measured by the firm's market capitalization and business risk as measured by the leverage and corporate growth. However, the proportion of the institutional investors, dispersion of individual investors and government ownership proved to have little impact on the level of CSD.
Ghazali (2007)	The extent of corporate social responsibility (CSR) disclosure	Ownership concentration, director ownership, government ownership, company size, profitability and industry	----------	Time of Observation 2001 Sample Size 87 Malaysian companies Sample Type Non-financial companies included in the Bursa Malaysia Composite Index	Analysis OLS Regression General Result The two ownership variables, director ownership and the government as a substantial shareholder have significant influence on CSR disclosure in annual reports. However the third ownership variable, ownership by the ten largest shareholders, was not statistically significant in explaining the level of CSR disclosure in annual reports.
Hossain and Reaz (2007)	The extent of voluntary disclosure	Corporate size, corporate age, multiple exchange listing, business complexity, board composition (percentage of non-executive directors) and assets in-place	----------	Time of Observation 2002/2003 Sample Size 38 Indian companies Sample Type Indian banks listed on the Bombay Stock Exchange (BSE) and the National Stock Exchange (NSE)	Analysis OLS Regression General Result Results revealed that corporate size and assets in-place are significantly associated with disclosure, while corporate age, multiple exchange listing, business complexity, and board composition (percentage of non-executive directors) are insignificant in explaining the level of disclosure.

Author(s) & Date	Variables			Time of Observation, Sample Size & Sample Type	Analysis &General Result
	Dependent Variable	Independent Variable	Control Variable		
Huafang and Jianguo (2007)	The level of voluntary disclosure including environmental disclosure	Ownership structure (including blockholder ownership, managerial ownership, state ownership, legal-person ownership and foreign listing/shares ownership) and Board composition (including proportion of independent directors and CEO duality.	Firm size, Leverage, Firm growth and Auditor reputation	Time of Observation 2002 Sample Size 559 Chinese firms Sample Type Firms listed on Shanghai Stock Exchange (SSE)	Analysis 1- Pearson correlation 2- OLS Regression General Result Higher blockholder ownership and foreign listing/shares ownership were found to be associated with increased disclosure, while managerial ownership, state ownership and legal person ownership were not related to disclosure. An increase in independent directors increased corporate disclosure and CEO duality was associated with lower disclosure. Also larger firms had greater disclosure, while firms with growth opportunities were reluctant to disclose information voluntarily. However, both leverage and auditor reputation were not significant to voluntary disclosure.
Lim *et al*. (2007)	The level of voluntary disclosure including environmental disclosure	Board composition	Firm size, leverage, profitability, type of auditor, industry classification, shareholder concentration, management compensation and investment growth set	Time of Observation 2001 Sample Size 181 Australian companies Sample Type Firms included in the Australian Top 500 companies for the last three-year period, 1999–2001	Analysis 2SLS (Two-Stage Least Squares) Regression General Result The results indicated a positive association between board composition and total voluntary disclosure. Furthermore, the results indicated that (a) boards composed largely of independent directors voluntarily disclose more forward looking quantitative and strategic information and (b) board structure has no bearing on non-financial and financial voluntary disclosure. Other drivers of voluntary disclosure were firm size, shareholder concentration, industry classification, management compensation and investment growth set.

Author(s) & Date	Variables			Time of Observation, Sample Size & Sample Type	Analysis &General Result
	Dependent Variable	Independent Variable	Control Variable		
Rizk *et al*. (2008)	The extent of social and environmental reporting	Private ownership, government ownership and industry membership	----------	Time of Observation 2002 Sample Size 60 Egyptian companies Sample Type A random sample of Egyptian companies in the industrial sector selected from nine high polluting industries including food, beverage and tobacco, ceramics, chemicals, cement, pharmaceuticals, building materials and construction, textiles, and mills and storage.	Analysis ANOVA tests General Result Findings indicated government owned companies disclose more employee related information than private companies. On the other hand private companies were found to disclose customer related, environment related, and community related information more than governmental owned companies. In addition, industry membership was a statistically significant factor relative to the category of disclosure.
Al Arussi *et al*. (2009)	The level of voluntary financial and environmental disclosures	Ethnicity of CEO, leverage, level of technology, existence of dominant personalities, profitability and firm size	----------	Time of Observation 2005 Sample Size 201 Malaysian companies Sample Type Disproportionate stratified random sample of Malaysian listed companies on the Bursa Malaysia's Main and Second Boards	Analysis 1- Multivariate tests 2- Linear Regression General Result The results indicated that level of technology, ethnicity of CEO and firm size are determinants of both internet financial and environmental disclosures. However, the existence of a dominant personality was found to negatively affect the level of financial disclosures but not environmental disclosures. Yet leverage and profitability did not show any significant relationship with either financial or environmental disclosures.

Author(s) & Date	Variables			Time of Observation, Sample Size & Sample Type	Analysis &General Result
	Dependent Variable	Independent Variable	Control Variable		
Grüning and Ernstberger (2010)	Total disclosure and Areas of disclosure including financial, customers, value chain, employees, R&D, strategy, governance, stock market, environment, society	Board, audit, charter/bylaws, state of incorporation, ownership, executive and director compensation, progressive practices and director education	Size, ownership concentration, equity ratio, age, growth rate, leverage, capital intensity, loss, intangible assets, stock return, stock return volatility, issuer firm, type of auditor, market-to-book ratio, stock turnover, Tobin's Q, previous year disclosure and previous year corporate governance	Time of Observation 2003-2007 Sample Size 6,580 US firms Sample Type All US firms included in the ISS database for the period 2003 to 2007	Analysis 3SLS (Three-Stage Least Squares) Regression General Result The results indicated a significant positive association between firm-level corporate governance mechanisms and disclosure. In addition, both corporate governance and disclosure were simultaneously positively related to firm valuation in terms of Tobin's q. Overall, the results of the study are consistent with the view that corporate governance and disclosure are more complementary than substitutive mechanisms.
Michelon and Parbonetti (2010)	The level of sustainability disclosure	Board composition (independent directors and community influential members), Board structure (CSR responsible and CSR committee), and Board leadership (CEO duality).	Board size, Profitability, Size, Industry, Leverage, Market risk, Company age, Listing status, Country of origin and Corporate citizenship.	Time of Observation 2003 Sample Size 114European and American companies Sample Type 57 companies listed in Dow Jones Sustainability Index and 57 companies belong to the Dow Jones Global Index	Analysis 1- Spearman's rank correlations 2- OLS Regression General Result Results indicated that community influential is positively associated with the level of sustainability disclosure, while the proportion of independent directors, CEO duality and the presence of CSR committee are not.

Author(s) & Date	Variables			Time of Observation, Sample Size & Sample Type	Analysis &General Result
	Dependent Variable	Independent Variable	Control Variable		
Peters and Romi (2011)	Voluntary reporting of greenhouse gas (GHG) emission accounting information	Existence of an environmental committee on the board and a sustainability officer as well as environmental committee size, diligence, expertise, knowledge spillover and sustainability officer expertise	Environmental performance, cumulative number of previous disclosures, cross listing, inclusion on sustainability indices, oil industry, paper industry, petroleum industry, chemical industry, metals industry, CEO duality, institutional ownership, profitability, size, growth and leverage	Time of Observation 2002-2006 Sample Size 500 US firms Sample Type All US firms participating in the Carbon Disclosure Project (including all US firms in the FT500)	Analysis 1- Pearson Correlation 2- OLS Regression General Result Results revealed that GHG emission accounting disclosures are positively associated with the presence of environmental committees on boards of directors and corporate sustainability officers. Furthermore, the size and diligence of the environmental committee and expertise of the sustainability officer were positively related to voluntary disclosure. Committee members with expertise in environmental sustainability were positively associated with disclosure. Finally, knowledge spillover from overlap between environmental committees and audit committees significantly was found to increase the likelihood of GHG emission accounting disclosures.
Post *et al*. (2011)	Environmental corporate social responsibility (ECSR) disclosures: Disclosed ECSR Governance, Disclosed ECSR Credibility, Disclosed environmental performance indicators, Total disclosed ECSR score and Natural environment ratings data: KLD environmental Strengths, KLD environmental concerns, Total KLD	Directors' insider/outsider status, gender, age, and education	Industry, slack resources and CEO duality	Time of Observation 2006 Sample Size 78 US firms Sample Type Electronics firms found in the 2006 list of Fortune 1000 companies and the chemical firms found in the 2007 list of Fortune 1000 companies	Analysis 1- Pearson Correlation 2- OLS Regression General Result The study found that a higher proportion of outside board directors is associated with more favorable ECSR disclosures and higher KLD strengths scores. Firms with boards composed of three or more female directors received higher KLD strengths scores. In addition, boards whose directors average closer to 56 years in age and those with a higher proportion of directors with Western European education were more likely to implement environmental governance structures or processes.

2.5 EXAMINING THE RELATIONSHIP BETWEEN ENVIRONMENTAL DISCLOSURE QUALITY AND CORPORATE GOVERNANCE

For the purposes of the current study, prior studies examining the quality of corporate environmental disclosure can be classified into two groups: the impact of corporate characteristics on environmental disclosure quality and the impact of corporate governance on environmental disclosure quality. These studies are presented in a chronological order to help trace the gradual evolution and development of any achievements or addition to the existing body of literature.

2.5.1 Impact Of Corporate Characteristics On Corporate Environmental Disclosure Quality

Magness (2006) tested Ullmann's hypothesis that strategy posture, modified by financial performance, must be considered in light of stakeholder power in order to understand a company's social responsibility disclosure policy. The study used regression analysis to examine annual report disclosure of environmental information after a major accident in the mining industry. A broadly defined disclosure score was used to assess environmental disclosure at the end of 1995 for a sample of 44 Canadian companies. The seven-point scoring factor was designed to include a variety of information categories such as monetary items versus and qualitative items as well as future-oriented financial items versus historical ones.

Strategic posture was measured using press releases and the control variables of external funding, size and financial performance were included in the analyses. Results indicated that companies that maintain themselves in the public eye through press release activity disclose more information than other companies. However, there was no evidence to suggest that disclosure content is moderated by financial performance (ROA). Companies that obtained external financing one year after the accident made more disclosure than other companies. The significance of the external financing variable was evident when disclosure is restricted to discretionary or non-financial items, but disappeared when the dependent variable represents mandatory financial items. Finally, environmental disclosure increased with company size.

García-Sánchez (2008) established a new methodology in the analysis of the corporate social information disclosed by companies. The dependent variable examined is the Informative Segments of Companies. That is, each segment groups those firms that issue the same contents or categories of information, and furthermore the characteristics of the information issued in each category – qualitative type, non-monetary quantification, or monetary quantification – are identical. Corporate characteristics investigated include size, industry and profitability. The study used a sample of 32 companies out of the 35 largest Spanish companies that are quoted in the stock market, constituting the index IBEX35 of the Spanish stock exchange.

Specifically, two groups or informative segments of companies were identified. The first segment is characterized by the disclosure of an elevated content of quantitative information about diverse items related to the environment, employees and other industrial relations, at the same time as disclosing monetary information about community relations. The second group is characterized by a smaller content of information disclosed with respect to the environment, employees and other industrial relations, expressed, in addition, in qualitative terms. Membership in the first informative segment of companies, that is, those which pay greater attention to the voluntary disclosure of corporate social information, is typical of the larger-sized Spanish companies whose economic activity is related to highly sensitive industry sectors. However, none of the profitability can be considered as a determinant of the level of corporate social information disclosed.

Cooper and Zainudin (2009) analyzed the scope, quality and medium of reporting on environmental matters for 2005 using a sample of 315 listed firms drawn from nine countries, including developing countries and developed. Factors examined include country's economic development, country's accounting system, firm size, business sector membership, profitability and leverage. Quality is measured on two dimensions. First, the quality of information provided in terms of the nature and depth of disclosure, treating quantification and contextualization with targets as characteristics of higher quality, following an approach similar to that of Toms (2002). Second, the scope of disclosure in terms of the variety of different matters covered in either the annual report or, where relevant, the standalone report.

For each environmental indicator specified in the GRI (2002) guidelines, an information quality rating is assigned on the ordinal scale: 0 = no disclosure; 1 = qualitative disclosure only; 2 = non-monetary quantitative disclosure only; 3 = monetary quantitative disclosure. Both economic development and accounting system were found to be highly significant determinants of whether a standalone report is produced. Relative size was also found to be influential but environmental sensitivity as represented by sector appeared to be immaterial. However, larger firms were significantly more likely to produce a standalone report where they are also in a more sensitive sector. Finally, profitability had a weakly positive effect and leverage had a negative effect on the tendency to provide a supplementary report.

Mio (2010) examined factors influencing the quality of sustainability, environmental and social reports of listed multi-utility Italian companies. The study presented an analysis for the link between the quality of reports and the following variables: level of clarification of the sustainability strategy, level of complexity, territoriality (extension of the market), degree of maturity and experience in sustainability communication, rate of growth (turnover and number of employees), degree of privatization and organizational structure and organizational arrangements to support social and environmental responsibility. The approach to measure quality of reports is based on comparing the degree of application of principles required by the main reporting models used in the world (Global Reporting Initiative Third Generation: GRI-G3; AA1000 SES Accountability 1000: AA1000). The assessment of application is based on a scale of 0-5 (0 for non-applied principles, 5 for fully respected principles).

The principles assessed and the assessment criteria used are as follows: materiality, inclusiveness, context of sustainability, completeness, balance, comparability, accuracy, timelines, clarity, reliability. Both the level of the materiality of the reports and the inclusiveness of stakeholders were lower than other principles, even for sustainability reports from companies with a high level of compliance. The analysis showed that variables influencing the quality of reports are the complexity, the territoriality and number of employees and to limited extent the level of privatization. There were no correlation between the quality of reports and each of turnover and organizational structure.

Roy and Ghosh (2011) investigated the two-way association between economic performance and quality of discretionary environmental disclosure practices, controlling for industry and country. The study focused on seven Asian countries, namely, India, Japan, China, South Korea, Malaysia, Indonesia and Israel. Using content analysis, the study closely followed the scoring method of Clarkson *et al*. (2006) with necessary adjustments due to changes in reporting guidelines. First, certain environmental disclosure points are identified and then a score is assigned to each disclosure points using a 'yes/no' or 0, 1 criterion. Then the total score of each individual disclosure points are added to get the aggregate score. The pre-identified disclosure points contain the qualitative aspect of objective disclosure, and thus, the index represents the quality of environmental disclosure.

The result of primary research design suggested that economic performance and discretionary environmental disclosure quality are not simultaneously related and thus are not endogenous. The OLS regression revealed that sustainable environmental practices and the discretionary disclosures have negative or very low positive as well as insignificant association with the economic performance of the firm. Interestingly, the study showed that companies that belong to environmentally sensitive industries tend to disclose less objective information leading to lower quality disclosures. Similarly, companies that belong to countries having high relative emissions also showed a less informative and low quality of disclosure.

Table 2.3

Empirical Studies On the Impact Of Corporate Characteristics On Corporate Environmental Disclosure Quality

Author(s) & Date	Variables			Time of Observation, Sample Size & Sample Type	Analysis &General Result
	Dependent Variable	Independent Variable	Control Variable		
Magness (2006)	The quality level of environmental disclosure	Strategic posture (as measured by press releases)	External funding, size and Financial performance	Time of Observation 1995 Sample Size 44 Canadian companies Sample Type Gold mining Canadian companies publicly traded and identified with a primary compustat SIC of 1040 (gold & silver ores)	Analysis 1- Spearman's Rank Correlation 2- OLS Regression General Result Results indicated that increases in corporate environmental disclosure are associated with: (1) companies pursuing an active strategy of stakeholder management through press releases, (2) companies having plans to access external financial markets and (3) large-sized companies. However, there was no evidence to suggest that disclosure content is moderated by financial performance.
García - Sánchez (2008)	Corporate social reporting content and characteristics	Size, industry and profitability	----------	Time of Observation 2004 Sample Size 32 Spanish companies Sample Type The 35 largest Spanish companies quoted in the stock market (index IBEX35 of the Spanish stock exchange)	Analysis 1- Cluster analysis estimation algorithms 2- Discriminant analysis General Result Results indicated that both corporate size and industry membership are associated with corporate social disclosure, while there is no association between profitability and such disclosure.

Author(s) & Date	Variables			Time of Observation, Sample Size & Sample Type	Analysis &General Result
	Dependent Variable	Independent Variable	Control Variable		
Cooper and Zainudin (2009)	The scope, quality and medium of environmental reporting	Country's economic development, country's accounting system, firm size, business sector membership, profitability and leverage	----------	Time of Observation 2005 Sample Size 315 firms Sample Type Listed firms drawn from nine countries (UK, US, Germany, Japan, China, India, Indonesia, Malaysia and Australia), including developing countries and developed countries with different culturally-defined accounting systems, but all with exclusively or largely unregulated and voluntary regimes for such reporting	Analysis 1-Wilcoxon test 2- Logistic regression General Result Both economic development and accounting system were found to be highly significant determinants of whether a standalone report is produced. Relative size was also found to be influential but environmental sensitivity as represented by sector appeared to be immaterial. However, larger firms are significantly more likely to produce a standalone report where they are also in a more sensitive sector. Finally, profitability had a weakly positive effect and leverage had a negative effect on the tendency to provide a supplementary report.
Mio (2010)	The quality of sustainability, environmental and social reporting	Level of clarification of the sustainability strategy, level of complexity, territoriality, degree of maturity and experience in sustainability communication, rate of growth, degree of privatization and organizational structure and organizational arrangements to support social and environmental responsibility	----------	Time of Observation 2006 Sample Size 12 Italian companies Sample Type Multi-utility companies listed on the Italian Stock Exchange	Analysis Correlation Analysis General Result The analysis showed that variables influencing the quality of reports are the complexity, the territoriality and number of employees and to limited extent the level of privatization. There were no correlation between the quality of reports and each of turnover and organizational structure.

Author(s) & Date	Variables			Time of Observation, Sample Size & Sample Type	Analysis &General Result
	Dependent Variable	Independent Variable	Control Variable		
Roy and Ghosh (2011)	The quality of discretionary environmental disclosure	Economic performance	Industry and country	Time of Observation 2004-2009 Sample Size 69 companies Sample Type Companies from seven Asian countries including India, Japan, China, South Korea, Malaysia, Indonesia and Israel	Analysis 1- Hausman specification test 2- OLS regression General Result Results suggested that economic performance and discretionary environmental disclosure quality are not simultaneously related and thus are not endogenous. Sustainable environmental practices and the discretionary disclosures had negative or very low positive as well as insignificant association with the economic performance of the firm. Companies that belong to environmentally sensitive industries tended to disclose less objective information leading to lower quality disclosures. Similarly, companies that belong to countries having high relative emissions also showed a less informative and low quality of disclosure.

2.5.2 Impact Of Corporate Governance On Corporate Environmental Disclosure Quality

Adams (2002) examined the internal contextual factors and their impact on corporate social and ethical reporting. The internal contextual factors considered include aspects of the reporting process and attitudes to reporting, its impacts, legislation and audit. Process variables included corporate structure and governance procedures, extent and nature of stakeholder involvement, and extent of involvement of accountants. Attitudes variables included views on recent increase in reporting, reporting bad news, reporting in the future, regulation and verification, perceived costs and benefits of reporting and corporate culture. Interviews were carried out with three British companies and four German companies during 1998. All the companies were in the chemical and/or pharmaceutical business and were amongst the largest 400 companies listed in *The Times 1000* (1995).

A key finding of this study is that there are significant internal contextual variables which are likely to impact on the extensiveness, quality, quantity and completeness of corporate social and ethical reporting. The study found that the process of reporting appears to depend on country of origin, corporate size and corporate culture. Aspects of process which appear to be influenced by these variables are the degree of formality versus informality, the departments involved and the extent of engagement of stakeholders. Accountants were found to be neither involved in data collection nor considered appropriate people to be involved. The attitudes of interviewees were also likely to have an influence on the extent and nature of reporting. For example, the main motivation for corporate ethical reporting was to enhance corporate image and credibility with stakeholders. Public pressure was an important reason for developments and changes in reporting practice. Further, there was a general agreement that reporting bad news enhances corporate credibility and image. Finally, attitudes to audit vary between companies, with some companies not having an audit and others having audits of only limited scope.

Cormier *et al.* (2005) suggested a multi-tiered theoretical framework that views a firm's decision to provide environmental disclosure as reflecting its responsiveness to different levels of influence: financial stakeholders' information needs, society's

environmental concerns which translate into public pressures and institutional constraints and processes which could be either company - or country - specific. Environmental disclosure is measured using a coding comprising thirty-nine items that are grouped into six categories: environmental expenditures and risks, laws and regulations, pollution abatement, sustainable development, land remediation and contamination (including spills), and environmental management. Quality rating is based on a score of one to three: three for an item described explicitly in monetary or quantitative terms, two when an item is described specifically and one for an item discussed in general.

The influence of the following variables were examined: information costs (as captured by risk, reliance on capital markets, trading volume, concentrated ownership and foreign ownership); financial condition (as captured by market return and leverage); and media pressure (as proxied by media exposure). In addition, the study controlled for fixed assets age, firm size and SEC registrant. Environmental disclosure quality was analyzed during the 1992–1998 period among a sample of 55 of the large German firms that comprise the DAX 30/DAX 70 indices.

Results indicated that information costs, as proxied by risk and ownership, are potentially important determinants of environmental disclosure strategy. Moreover, environmental disclosure quality was related to media pressure, while there was no relation between financial condition and environmental disclosure. Results also showed that environmental disclosure quality is conditioned by industry membership. In addition, fixed assets age, firm size determined the level of environmental disclosure by German firms in a given year. Finally, consistent with institutional theory predictions, there was evidence that imitation and routine determine environmental disclosure quality. Overall, results strongly suggest that environmental disclosure is multidimensional and is driven by complementary forces.

Brammer and Pavelin (2006) examined the patterns in voluntary environmental disclosures made by a sample of large UK companies. The analysis distinguished between the decision to make a voluntary environmental disclosure and decisions - concerning the quality of such disclosures, examining how each type of decision is determined by firm and industry characteristics. Disclosure data were obtained from the "PIRC Environmental Reporting 2000" survey. The PIRC is an independent

research consultancy that conducts the most comprehensive study of environmental disclosure by listed companies in the UK. They identify six indicators of the quality of corporate environmental disclosure: disclosure of an environmental policy; existence of board-level responsibility for environmental matters; the description of environmental initiatives; reporting on environmental improvements; setting of environmental targets; and the presence of an environmental audit or assessment.

Disclosure quantity is a dichotomous variable depending on whether or not a company participates in any of the six components of environmental disclosure identified in the PIRC's report, while disclosure quality is the number of the aspects identified by the PIRC apparent in the disclosure of each company. The initial sample of the study was FTSE All Share comprised approximately 700 companies while the final sample consisted of 447 companies. Probit and Ordered Probit methods of estimation were used for the models developed concerning the quantity and quality of environmental disclosures respectively.

Results of the regression analysis revealed that industries with highly visible environmental issues and firm size have a highly significant positive effect on the likelihood that companies make environmental disclosures, and that highly leveraged companies are significantly less likely to make such disclosures. A significant negative relationship was found between the size of the largest shareholding in a company and the probability of environmental disclosure, while no significant relationship existed between the likelihood of making environmental disclosure and profitability, environmental performance, media visibility or the number of non-executive directors. Concerning the quality of environmental disclosures, there existed strong evidence of cross-sector variation with higher quality disclosures for environmentally-sensitive industries, significant positive relationship to firm size and environmental performance, significant negative relationship to both leverage and the size of the largest shareholding and no significant role for media visibility, current profitability or the number of non-executive directors.

Boesso and Kumar (2007) examined what factors in addition to the needs of financial markets drive voluntary disclosure practices – including those of environmental disclosure – of companies in Italy and in the United states. Information provided in the management discussion and analysis section of the annual reports of 72 companies

was content analyzed for 2002 to determine the volume and the quality of voluntary disclosures. The sample companies were chosen from companies listed on the Milano-Mercato Ordinario and the New York stock Exchange; 36 companies have received awards for the quality of their corporate communication and 36 companies have not.

Seven specific perspective were identified as a framework for the study including investor, employee, customer, supplier, social and environmental, internal processes and innovation and leaning. Key performance indicators were identified for each of the seven perspectives and actual performance was captured using content analysis technique. Actual disclosures were classified according to the type of information (qualitative and quantitative), nature of information (financial and non-financial) and information on outlook (forward looking and historical). An index of disclosure quality was then developed by assigning different weights to different types of information. Factors examined were categorized as those related to investor's information needs (business complexity and industry instability & volatility) and within–company factors (corporate governance, stakeholder engagement, and intangible asset management). Moreover, company size and industry membership were controlled for in the study.

The relationship was examined using the Ordinary Least Square (OLS) regression technique. Results provided some support to the effect that factors related to investors' information needs (business complexity and industry instability & volatility) influence the volume of voluntary disclosures. However, these factors appeared to have little impact on the quality of voluntary disclosures. Results also showed that factors such as company emphasis on stakeholder management and relevance of intangible asset affect the quality of voluntary disclosures in case of Italian companies but not in case of USA companies. In addition, the results confirmed that company size, and to a lesser extent the industry in which the company operates, influences voluntary disclosures made by companies.

Brammer and Pavelin (2008) examined the patterns in the quality of voluntary environmental disclosures made by a sample of 477 large UK companies drawn from a diverse range of industrial sectors. The analysis distinguishes between five facets of quality of corporate environmental disclosure: disclosure of environmental policy, the

description of environmental initiatives, reporting on environmental improvements, settings of environmental targets, and the presence of an environmental audit or assessment. The study examined how the decisions firms face, regarding each facet of quality, are determined by firm and industry characteristics. Data concerning environmental disclosures were obtained from the PIRC Environmental Reporting 2000 survey. The PIRC is an independent research consultancy that conducts the most comprehensive study of environmental disclosure by listed companies in the UK.

Quality was hypothesized to be driven by the nature of a firm's business activities, its environmental performance, organizational size, media visibility and financial resources and the composition of both ownership and the main board. Logit estimation method was used and logit regressions were run with and without cross-sector variation. Results found the quality of environmental disclosure to be determined by a firm's size and the nature of its business activities. High quality disclosures were primarily associated with larger firms and those in sectors most closely related to environmental concerns. In contrast to several recent contributions, results indicated that the media exposure of companies plays no role in stimulating voluntary environmental disclosure.

O'Sullivan *et al.* (2008) investigated the role played by a firm's corporate governance framework in the decision to voluntarily disclose forward-looking information in the published financial reports of Australian companies in 2000 and 2002. The 2000 and 2002 published annual reports were examined for the largest 300 publicly listed firms according to net profit for the year 2000, as identified in the Business Review Weekly (BRW). Voluntary disclosure of forward-looking information was recognized provided the projection can be classified in terms of the following four characteristics: direction (up, down or no change); type (income/profit, cash flow, sales/revenue); location (Directors' Report, CEO's/Managing Director's Report, Review of Operations, Chairman's Report, D&A and other); and nature (qualitative, quantitative).

The first corporate governance category, board autonomy, reflects board independence, the absence of a dominant personality within the firm, the independence of the chair and non-executive director shareholdings. The second category relates to board committees and is comprised of the presence and

independence of a compensation committee, as well as the appointment of a nomination committee. The next category considers the ownership structure prevalent within the firm including institutional ownership, block shareholdings and concentration of shareholdings. The final measure of corporate governance pertains to the audit function including the appointment of audit committee, its independence, frequency of its meetings, audit firm size and auditor independence. A summary measure of corporate governance, which takes into account values calculated for the categories was developed. In addition, the study controlled for firm size, performance, information environment and leverage.

Logistic regression analysis was employed. With respect to the year 2000, the corporate governance category, audit quality, consisting of the presence and independence of the audit committee, its meeting frequency, the use of a big 6 auditor and the auditor's independence, was positively associated with the disclosure of forward-looking information. The corporate governance category, board committees, consisting of the appointment and independence of a compensation committee and the creation of a nomination committee, and the overall efficacy of the corporate governance system were also positively associated with the disclosure of forward-looking information. However, results revealed that corporate disclosure does not seem to be driven by the same factors in 2002 since in that year none of the governance categories is significantly associated with the firm's decision to publish forward-looking information in financial reports.

Prado-Lorenzo *et al.* (2009) tested a stakeholder theory approach to analyzing corporate social disclosures and examined the effect that shareholder power and dispersed ownership structure have on the decision to disclose corporate social responsibility (CSR) information in the Spanish context. The study analyzed the level of contents, their quality and their objectivity through compliance with the rules for preparation of the GRI model. It also took into account whether the fulfillment of these rules has been certified by the GRI organization, and whether the data reflected have been verified or audited by entities independent of the firm. The variables examined included the presence of financial institution in the corporate ownership structure, the presence of a physical person that represents a dominant shareholder and the number of independent directors. Several factors have been controlled for

including government power (size, transport and communications sector, industrial sectors, energy sector and construction sector); creditors' power (debt-to-equity ratio); strategic posture (ISO14001 certification and OHSAS18001 certification) and economic Performance (ROA).

The empirical results, based on a sample of 99 non-financial Spanish firms quoted on the Spanish continuous market, revealed only a limited association between the presence of a physical person that represents a dominant shareholder and corporate social disclosures. Results confirmed that the influence exerted by certain stakeholders (government and creditors), together with the strategic posture of the firm, have an important effect on the publication of a CSR report. On the contrary, economic performance had a null effect on this process. From the point of view of the shareholders, especially in an ownership structure defined by the presence of a main shareholder that exerts control over the firm, there was encouragement to adopt the GRI format as a CSR reporting model to be used by the firm for disclosing information. In contrast, financial institutions, investors that are unable to move funds quickly in and out without affecting share price, and dispersed shareholders seemed to be only interested in the financial performance of the firm, but not in its sustainable strategies or activities.

Hassan (2010) investigated the impact of several factors on both the quantity and quality of corporate social disclosure in annual reports as well as stand-alone reports. The factors examined were classified as corporate characteristics (corporate size, type of activity, profitability and multinationality); media pressure; and corporate governance (board size, board composition, presence of social responsibility committee and block ownership). With respect to the annual reports, the quantity of corporate social disclosure was measured by the number of sentences, while the disclosure quality was measured using a two-point ranking system with value 1, for quantity and specific disclosure, and value 0, for general disclosure. However, in case of stand-alone reports, the quantity of corporate social disclosure was measured by the number of report pages, while the disclosure quality was measured as a two-point dummy variable, according to which a report is audited or not and prepared using reporting guidelines or not.

The study analyzed a sample of companies comprising FTSE 100 and FTSE 250 for the years 2005 and 2006. Empirical analysis indicated that corporate social disclosure is associated with corporate size, industry, media pressure, board size, corporate social responsibility committee and ownership diffusion. However, results suggested that these factors are more associated with the quantity of disclosure than its quality. An exception is media pressure which was not associated with the quality of corporate social disclosure.

Rupley *et al.* (2011) investigated the relationship between specific aspects of multistakeholder governance and the quality of voluntary environmental disclosure. Four related measures of environmental disclosure quality employed were compliance, pollution prevention, product stewardship and ecological sustainability. These environmental strategies move progressively from the lowest quality level of compliance to the highest quality level of sustainable development, implying - as argued by the authors - an increasingly integration of environmental stewardship into organizational culture. A disclosure index, initially based on the Global Reporting Initiative's (GRI) framework, was used to capture the strategic implications of environmental behavior.

Environmental disclosure data were collected from both firms' stand-alone corporate reports and annual or 10-K reports. The study examined the role of environmental legitimacy (as proxied by environmental media coverage), the influence of institutional investor ownership (including both long-horizon and short-horizon institutional ownership) and the influence of multi-stakeholder governance (including board independence, gender diversity, multiple directorships, separation of the CEO from the board chair position and the existence of a corporate social responsibility committee). Moreover, the study controlled for firm size, profitability, industry sensitivity, regulation sensitivity and presence of a separate corporate environmental report.

Based on a sample of 127 US firms drawn from the Dow Jones Global Index over a three-year period (2000, 2003 and 2005), the final data set included 361 firm-year observations. The sample firms were drawn from five industries; chemical, oil and gas, electrical utilities, pharmaceutical and biotech and food and beverage. Using both univariate and regression analyses, results suggested that voluntary environmental

disclosure quality is positively associated with board independence, gender diversity, and multiple directorships while negatively associated with environmental media. In addition, the percentage of directors serving on multiple boards is positively related to three levels of voluntary environmental disclosure quality individually examined (i.e. compliance, pollution prevention and product stewardship) and board independence and diversity are each positively related to at least one level of voluntary environmental disclosure quality.

Cormier *et al.* (2011) examined the informational contribution of social and environmental disclosures for investors. The study investigated whether social disclosure and environmental disclosure quality have a substituting or a complementing effect in reducing information asymmetry between corporate managers and stock market participants. The factors examined as possible determinants of social and environmental disclosures were environmental performance, free float (ownership dispersion), analyst following, leverage, profitability, firm size, board independence, board size, audit committee size and environmental media exposure.

Environmental disclosure items grouped into two broad dimensions. On one hand, there is disclosure about environmental debts, risks and litigations, which captures four components of the content grid: expenditure and risk; compliance with laws and regulations; pollution abatement; and land remediation and contamination. On the other hand, there is disclosure about environmental management practices that relates to sustainable development and environmental management grid captions. The quality rating is based on a score from one to three. Three points are awarded for an item described in monetary or quantitative terms, two are awarded when an item is described specifically (qualitative), and one is awarded for an item discussed in general (indicative).

The sample comprised 137 large Canadian companies included in Toronto Stock Exchange S&P/TSX Index for the year 2005. Using regression analysis, results of the regression coefficients indicated that environmental performance, environmental news exposure and firm size are key drivers of both environmental and social disclosures. Analyst following, board size and, to a lesser extent, leverage are significantly related to environmental disclosure. However, no significant relationship is detected between

the quality of environmental disclosures and each of free float (ownership dispersion), profitability, board independence and audit committee size.

Marshall *et al.* (2011) examined the association between specific aspects of corporate governance and the quality of voluntary environmental information disclosed by firms. Three specific governance related factors examined are institutional investor type (including both long-horizon and short-horizon institutional ownership), shareholder proposal outcomes (including withdrawn, disqualified and voted) and board composition (including external board representation). The study employed a sample of 183 firms drawn from five industries (chemicals, oil and gas, utilities, pharmaceutical and biotech, and food and beverage) from the Dow Jones Global index over a three-year period (2000, 2001 and 2002). Four related measures of environmental disclosure quality were used: compliance, pollution prevention, product stewardship and ecological sustainability. An index of disclosure quality based on four progressive levels of environmental strategy and management was developed. Disclosure items were grouped into eight different forms of disclosure relating to the four levels of environmental strategy. Environmental disclosure data were collected from both firms' stand-alone corporate reports and annual or 10-K reports. The study controlled for firm size and profitability.

Results indicated no evidence of a relation between pension fund equity percentage or long-horizon institutional ownership and any of the measures of voluntary environmental disclosure quality. However, investment fund equity or short-horizon institutional ownership was negatively related to all four levels of disclosure. The study also documented a consistently positive relationship between withdrawn resolutions and the quality of voluntary environmental disclosure in terms of compliance, pollution prevention and product stewardship. While resolution disqualification was found to be marginally significant and positively related to only product stewardship level of voluntary environmental disclosure quality, the study was unable to document a relation between the number of resolutions that are ultimately voted on and any of all four levels of disclosure. Board composition was unrelated to all four measures of voluntary environmental disclosure quality. Nevertheless, firm size and profitability were significantly and positively related to all four measures of voluntary environmental disclosure quality.

Table 2.4

Empirical Studies On the Impact Of Corporate Characteristics On Corporate Environmental Disclosure Quality

Author(s) & Date	Variables			Time of Observation, Sample Size & Sample Type	Analysis &General Result
	Dependent Variable	Independent Variable	Control Variable		
Adams (2002)	The extensiveness, quality, quantity and completeness of corporate social and ethical reporting	Corporate structure and governance procedures; Extent and nature of stakeholder involvement; Extent of involvement of accountants; Views on recent increase in reporting, reporting bad news, reporting in the future, regulation and verification; Perceived costs and benefits of reporting; and Corporate culture.	----------	Time of Observation 1998 Sample Size 3 British companies and 4 German companies Sample Type Chemical and pharmaceutical companies from the largest 400 companies listed in the *Times 1000* (1995)	Analysis Descriptive data from Interviews General Result The study found that the process of reporting appears to depend on country of origin, corporate size and corporate culture. Aspects of process influenced by these variables are the degree of formality versus informality, the departments involved and the extent of engagement of stakeholders. Accountants were found to be not involved in data collection. Enhancing corporate image and credibility with stakeholders was the main motivation of reporting. Bad news was found to enhance corporate credibility and image. Finally, some companies had a social and environmental audit while others having audits of only limited scope.
Cormier *et al*. (2005)	The level and quality of environmental disclosure	Information costs (as captured by risk, reliance on capital markets, trading volume, concentrated ownership and foreign ownership); financial condition (as captured by market return and leverage); and media pressure (as proxied by media exposure)	Fixed assets age, firm size and SEC registrant	Time of Observation 1992–1998 Sample Size 55 German companies Sample Type Large German firms that comprise the DAX 30/DAX 70 indices	Analysis OLS Regression General Result Results indicated that information costs, as proxied by risk and ownership, are potentially important determinants of environmental disclosure strategy. Moreover, environmental disclosure quality was related to media pressure, while there was no relation between financial condition and environmental disclosure. Results also showed that environmental disclosure quality is conditioned by industry membership. In addition, fixed assets age, firm size determined the level of environmental disclosure by German firms in a given year.

Author(s) & Date	Variables			Time of Observation, Sample Size & Sample Type	Analysis &General Result
	Dependent Variable	Independent Variable	Control Variable		
Brammer and Pavelin (2006)	The level and quality of voluntary environmental disclosure	Industry type, Environmental performance, Firm size, Organizational visibility, Company ownership, Profitability, Leverage and Board composition.	----------	Time of Observation 2000 Sample Size 447 UK companies Sample Type FTSE All Share after certain exclusions	Analysis Probit and Ordered Probit Regression General Result The likelihood of making voluntary environmental disclosure is positively associated with highly sensitive industries, larger firms and less-leveraged companies; is negatively associated with the size of the largest shareholding; and has no significant relationship to profitability, environmental performance, media visibility or the number of non-executive directors. The same results were reached concerning the quality of environmental disclosures except for environmental performance which was found to be significantly and positively related to the quality of such disclosures.
Boesso and Kumar (2007)	The volume and quality of voluntary disclosures	Investor's information needs (business complexity and industry instability & volatility) and within–company factors (corporate governance, stakeholder engagement, and intangible asset management)	Company size and industry membership	Time of Observation 2002 Sample Size 72 Italian and US companies Sample Type Companies selected from those listed on the Milano-Mercato Ordinario and the New York stock Exchange	Analysis 1- Correlation Analysis 2- OLS Regression General Result Results provided some support to the effect that factors related to investors' information needs (business complexity and industry instability & volatility) influence the volume of voluntary disclosures. However, these factors appeared to have little impact on the quality of voluntary disclosures. Results also showed that factors such as company emphasis on stakeholder management and relevance of intangible asset affect the quality of voluntary disclosures in case of Italian companies but not in case of USA companies. In addition, the results confirmed that company size, and to a lesser extent the industry in which the company operates, influences voluntary disclosures made by companies.

Author(s) & Date	Variables			Time of Observation, Sample Size & Sample Type	Analysis &General Result
	Dependent Variable	Independent Variable	Control Variable		
Brammer and Pavelin (2008)	The quality of voluntary environmental disclosures	Nature of a firm's business activities, its environmental performance, organizational size, media visibility and financial resources and the composition of both ownership and the main board	----------	Time of Observation 2000 Sample Size 447 UK companies Sample Type FTSE All Share after certain exclusions	Analysis 1- Correlation Analysis 2- Logit Regression General Result Results found the quality of environmental disclosure to be determined by a firm's size and the nature of its business activities. High quality disclosures were primarily associated with larger firms and those in sectors most closely related to environmental concerns. However, results indicated that the media exposure of companies plays no role in stimulating voluntary environmental disclosure.
O'Sullivan *et al*. (2008)	Voluntarily forward-looking disclosure	Total corporate governance and its categories: board autonomy, board committees, ownership structure and audit function	Firm size, performance, information environment and leverage	Time of Observation 2000 and 2002 Sample Size 183 Australian companies Sample Type The largest 300 publicly listed firms according to net profit for the year	Analysis 1- Mann-Whitney tests 2- Logistic regression General Result With respect to the year 2000, audit quality, consisting of the presence and independence of the audit committee, its meeting frequency, the use of a big 6 auditor and the auditor's independence, was positively associated with the disclosure of forward-looking information. Board committees, consisting of the appointment and independence of a compensation committee and the creation of a nomination committee, and the overall efficacy of the corporate governance system were also positively associated with the disclosure of forward-looking information. However, results revealed that corporate disclosure does not seem to be driven by the same factors in 2002.

Author(s) & Date	Variables			Time of Observation, Sample Size & Sample Type	Analysis &General Result
	Dependent Variable	Independent Variable	Control Variable		
Prado-Lorenzo *et al*. (2009)	The level and quality of corporate social disclosure (Validation, Information disclosed and GRI format)	Presence of financial institution in the corporate ownership structure, presence of a physical person that represents a dominant shareholder and number of independent directors	Government power (size, transport and communications sector, industrial sectors, energy sector and construction sector); creditors' power (debt-to-equity ratio); strategic posture (ISO14001 certification and OHSAS18001 certification) and economic Performance (ROA)	Time of Observation Not specified Sample Size 99 Spanish companies Sample Type Non-financial Spanish firms quoted on the Spanish continuous market	Analysis 1- VARIMAX rotation 2- OLS Regression General Result Results revealed only a limited association between the presence of a physical person that represents a dominant shareholder and corporate social disclosures. In an ownership structure defined by the presence of a main shareholder that exerts control over the firm, there was encouragement to adopt the GRI format as a CSR reporting model to be used by the firm for disclosing information. In contrast, financial institutions, investors that are unable to move funds quickly in and out without affecting share price, and dispersed shareholders seemed to be only interested in the financial performance of the firm, but not in its sustainable strategies or activities.
Hassan (2010)	The quantity and quality of corporate social disclosure	Corporate characteristics (corporate size, type of activity, profitability and multinationality); media pressure; and corporate governance (board size, board composition, presence of social responsibility committee and block ownership)	----------	Time of Observation 2005 and 2006 Sample Size 317 UK companies in 2005 and 327 in 2006 Sample Type FTSE 100 and FTSE 250	Analysis 1- Mann-Whitney tests 2- Kruskal–Wallis test 3- Correlation Analysis 4- OLS Regression 5- Poisson Regression General Result Empirical analysis indicated that corporate social disclosure is associated with corporate size, industry, media pressure, board size, corporate social responsibility committee and ownership diffusion. However, results suggested that these factors are more associated with the quantity of disclosure than its quality. An exception is media pressure which was not associated with the quality of corporate social disclosure.

Author(s) & Date	Variables			Time of Observation, Sample Size & Sample Type	Analysis &General Result
	Dependent Variable	Independent Variable	Control Variable		
Rupley *et al*. (2011)	Total quality of voluntary environmental disclosure and Types of voluntary environmental disclosure quality (compliance, pollution prevention and product stewardship)	Environmental media coverage, institutional investor ownership (long-horizon and short-horizon institutional ownership) and multi-stakeholder governance (board independence, gender diversity, multiple directorships, separation of the CEO from the board chair position and the existence of a corporate social responsibility committee)	Firm size, profitability, industry sensitivity, regulation sensitivity and presence of a separate corporate environmental report	Time of Observation 2000, 2003 and 2005 Sample Size 127 US firms Sample Type Firms drawn from the Dow Jones Global Index and from five industries; chemical, oil and gas, electrical utilities, pharmaceutical and biotech and food and beverage	Analysis 1- Pearson Correlation 2- OLS Regression General Result Results suggested that voluntary environmental disclosure quality is positively associated with board independence, gender diversity, and multiple directorships while negatively associated with environmental media. In addition, the percentage of directors serving on multiple boards is positively related to three levels of voluntary environmental disclosure quality individually examined (i.e. compliance, pollution prevention and product stewardship) and board independence and diversity are each positively related to at least one level of voluntary environmental disclosure quality.
Cormier *et al*. (2011)	The quality of social and environmental disclosures	Environmental performance, free float (ownership dispersion), analyst following, leverage, profitability, firm size, board independence, board size, audit committee size and environmental media exposure	----------	Time of Observation 2005 Sample Size 137 Canadian companies Sample Type Companies included in Toronto Stock Exchange S&P/TSX Index	Analysis 1- Correlation Analysis 2- OLS Regression General Result Results indicated that environmental performance, environmental news exposure and firm size are key drivers of both environmental and social disclosures. Analyst following, board size and, to a lesser extent, leverage are significantly related to environmental disclosure. However, no significant relationship is detected between the quality of environmental disclosures and each of free float (ownership dispersion), profitability, board independence and audit committee size.

Author(s) & Date	Variables			Time of Observation, Sample Size & Sample Type	Analysis &General Result
	Dependent Variable	Independent Variable	Control Variable		
Marshall *et al*. (2011)	Total quality of voluntary environmental disclosure and Types of voluntary environmental disclosure quality (compliance, pollution prevention, product stewardship and ecological sustainability)	Institutional investor type, shareholder proposal outcomes and board composition	Firm size and profitability	Time of Observation 2000-2002 Sample Size 183 US firms Sample Type Firms drawn from five industries (chemicals, oil and gas, utilities, pharmaceutical and biotech, and food and beverage) from the Dow Jones Global index	Analysis 1- Spearman Correlation 2- OLS Regression General Result Results indicated no evidence of a relation between pension fund equity percentage or long-horizon institutional ownership and any of the measures of voluntary environmental disclosure quality. However, investment fund equity or short-horizon institutional ownership was negatively related to all four levels of disclosure. The study also documented a consistently positive relationship between withdrawn resolutions and the quality of voluntary environmental disclosure in terms of compliance, pollution prevention and product stewardship. While resolution disqualification was found to be marginally significant and positively related to only product stewardship level of voluntary environmental disclosure quality, the study was unable to document a relation between the number of resolutions that are ultimately voted on and any of all four levels of disclosure. Board composition was unrelated to all four measures of voluntary environmental disclosure quality. Nevertheless, firm size and profitability were significantly and positively related to all four measures of voluntary environmental disclosure quality.

2.6 EXAMINING ENVIRONMENTAL DISCLOSURE QUALITY: MEANING, DIMENSIONS AND METRICS

The measurement of disclosure quality is a controversial topic in academic literature. Disclosure quality measurement is considered a difficult task. This difficulty can be attributed to the unresolved theoretical debate around the concept of quality itself, and consequently, the difficulty of determining a clear and accepted disclosure quality measurement. In addition to the definition of quality, issues concerning reliability, statistical inaccuracy and source data examined are also highlighted in the literature (Hammond and Miles, 2004). However, it can be argued that measurement depends largely on the researcher's definition of quality as fits with the purposes of the study.

Attempts have been made to distinguish different types of disclosure and hence to capture the distinct qualitative characteristics of the disclosed information. For example, Wiseman (1982) utilized an indexation procedure based on whether disclosure was monetary or quantitative; specific non-quantitative; or in general terms. Guthrie and Matthews (1985) extended the assessment to include whether the statements reflect well, badly or neutrally on the reporting entity. To these classifications Gray *et al.* (1995b) added an assessment of whether the disclosure is verified by an independent third party or not. Academic quality assessment has further progressed towards a more comprehensive analysis of disclosure, suggested by Beattie *et al.* (2004), through examining both the topic (relative amount and spread across topics) and the type (time orientation, financial/non-financial and quantitative/qualitative attributes) of disclosure.

In addition to previous studies examining the relationship between environmental disclosure quality and each of corporate characteristics and corporate governance, prior studies examining environmental disclosure quality dimensions and metrics (despite examining disclosure quality in general or relating quality to other variables), are also reviewed. This will permit an in-depth exploration of quality definition and measurement issues as presented in the literature. Prior studies are presented in a chronological order to help trace the gradual evolution and development of any achievements or addition to the existing body of literature.

Wiseman (1982) evaluated the quality and accuracy of environmental disclosures made in corporate annual reports. An indexing procedure was used to measure the contents of the disclosures. A rating sheet was developed to measure the extent of disclosure. The items on the rating sheet were classified into four categories. Category one represented items directly related to economic factors. Category two represented items relating to environmental litigation. Category three included pollution abatement items. Category four represented other environmentally related items which did not fall into any of the previous categories. Rating of the disclosures was based on the presence or absence and the degree of specificity of each of the information items. A score of three was assigned to an item if it was present in the disclosure and was described in monetary or quantitative terms. A score of two was assigned to an item if it was presented in the disclosure with company specific information in non-quantitative terms. One was assigned to items mentioned only in general terms. A zero was assigned if the item was not present in the disclosure.

Guthrie and Matthews (1985) measured the nature and extent of social responsibility disclosure in the annual reports of Australian companies. The following dimensions were used: Theme, Evidence, Amount, and Location. A method of recording and quantification of the four dimensions was used. However, these methods did not attempt to capture the qualitative features or characteristics of the data. Of particular link to quality measurement is the method of quantification, where data are classified into monetary, non-monetary and declarative. Moreover, a new category was introduced into the measurement process, that of news type. In other words, the assessment included whether the statements reflect well, badly or neutrally on the reporting entity.

Freedman and Stagliano (1992) examined the quality of social disclosures in the annual reports of US companies. The content of the disclosure was analyzed using a four element index that attempts to assess disclosure quality. These four elements are: time frame (past, present, future); effect (significant or not); monetary versus non-monetary; and reference to specific action, person, event, or place. The authors argue that the importance of disclosure should be based on what is included in the statement rather than how much is said. Accordingly, social disclosures were scored by

assigning a single point to each disclosure. If the report commentary involved future implications, or the disclosure was monetary, two points were given.

Patten (1995) analyzed the variability of social disclosure in annual reports. Disclosures examined were recorded based on the information items and categories identified. Disclosures were then classified as to whether they contained quantitative information. If quantitative information was included, it was further classified as to whether it was monetary or non-monetary in nature. In this regard, such assessment reveals a measure of disclosure quality rather than just disclosure quantity.

Gray *et al.* (1995b), in examining the methodological themes of constructing a research database of social and environmental reporting by UK companies, identified three quality assessment categorizations. These categories are "evidence", "news" and "auditability". The "Evidence" category refers to deciding whether the nature of the disclosed information is monetary, non-monetary quantitative, or declarative. As to "news", it reveals whether the news communicated by the disclosure is good, bad, or neutral. Finally, "auditability" is concerned with whether the information disclosed is verified by an independent third party or not. The authors argued that attempting to assess the quality of the data communicated can partially mitigate the loss of information resulting from the traditional methods of capturing the quantity of disclosure.

Gamble *et al.* (1995) developed a weighting scheme to evaluate the quality of environmental disclosures in annual reports and 10K. The assignment of weights was based upon the objective of environmental disclosures which is to provide stakeholders with information that will allow them to evaluate the long- and short-term environmental concerns of an entity in terms of risk, current and prospective cash flow requirements, and consistency with societal environmental concerns. Environmental concerns of an entity should be disclosed in the form of: (1) a policy statement regarding plans to produce, transport, store, and sell goods and/or services in the most environmentally safe manner; (2) statements regarding remediation for past actions, legal compliance, and plans for environmental improvements in operations; (3) the total monetary amount committed to such plans; (4) the monetary amount spent to date; (5) the monetary amount expected to be spent in each of the next ten years; (6) the types of environmentally- oriented assets that have and/or will

be acquired and the monetary amount associated with each type of asset; and (7) the results of the environmental audit. Based upon the previous objective, the following scheme was used to assess the quality of environmental disclosures in annual reports: Journal entry (JE) =1; Footnote (FN) =2; Environmental violation and/or remediation (V) =3-5; Short qualitative disclosure (SQD) =4-6; and Extended qualitative disclosure (EQD) =7-10.

In terms of the evaluation scheme, the lowest score is assigned to the least informative and the highest to the most informative disclosure. Journal entry (JE) is assigned the least score because its informational content is limited to past actions. Footnote (FN) is more informative because it discloses actual and expected future cash flow consequences of past environmental actions. Environmental violation and/or remediation (V) is more informative than FN because important environmental information is separately disclosed. Short qualitative disclosure (SQD) is more informative than V because at a minimum it contains information regarding an entity's environmental policy, legal compliance and restrictions, and changes in environmental regulations, in addition to operating and capital environmental expenditures and the effect of environmental matters on other aspects of operations. Extended qualitative disclosure (EQD) is the most informative because it provides the same basic information contained in SQD as well as information regarding plans for environmental improvements in operations such as the monetary amount expected to be spent in each of the next five years, the types of environmentally-oriented assets that have and/or will be acquired and the monetary amount associated with each type, and the results of the environmental audit.

Robertson and Nicholson (1996) suggested a three-level scoring system based on a qualitative hierarchy of social responsibility disclosure: from “General Rhetoric” to “Specific Endeavors” to “Implementation and Monitoring”. The first level, “General Rhetoric”, is corporate recognition of the value of social responsibility and reference to it in company documents. Disclosures at this level are somewhat vague and meaningless as they are not backed by specific objectives and actions. The second level, “Specific Endeavors”, consists of corporate social responsibility initiatives specifically tied to the company and its operating environment. The third level, “Implementation and Monitoring”, of social responsibility programmes is

characterized by activities such as annual environmental audits or reviews. This level is consistent with an overall corporate goal setting approach.

Walden and Schwartz (1997) used a four-element index to assess the quality of environmental disclosure in annual reports. The four elements or quality assessments are: (1) Effect - significant or not significant; (2) Quantification - monetary or not monetary; (3) Specificity - specific as to actions, persons, events, or places, or not specific; and (4) Time frame - past, present, or future. Significance effects were based on location within annual report, where disclosures found in the letter to shareholders and financial sections were deemed significant. The remaining three elements of disclosure were judged based on the presence or absence of each type of disclosure and the degree of specificity for each environmental disclosure theme. Each element of the index which was present in the disclosure received one point. If the disclosure involved the future, or the disclosure was monetary, it received two points for each. If the disclosure involved the current reporting period, it received one point. No points were given if the disclosure involved the past or the element was not present. Therefore, each environmental disclosure could receive a minimum of zero points and a maximum of six points based on the four-element index for quality assessment.

Hughes *et al.* (2001) examined the quality of environmental disclosures made in corporate annual reports. An indexing procedure, mostly similar to that used by Wiseman (1982) was employed to measure the contents of the disclosures. Content was classified as quantitative, descriptive, vague or immaterial. Quantitative refers to an environmental impact clearly defined in monetary terms or actual physical quantities. Descriptive denotes that the impact on the company or its policies was clearly evident. Vague means disclosures were limited to passing comments of environmental effects within discussions of other topics. Immaterial refers to those disclosures that stated environmental issues were immaterial to the financial condition and results of the corporation. Quantitative disclosures carried a weight of four, descriptive – three, vague – two, and immaterial – one. A zero was assigned if the item was not present in the disclosure.

Raar (2002) developed a weighting and ranking system to evaluate the quantity and quality of environmental disclosure in annual reports. Disclosure items were measured by monetary, non-monetary, qualitative discussion or a combination of all

three. Any given category of disclosure contained a nominal variable, "Did the report include any information relating to this category?", an ordinal variable, "how much?", and a continuous variable, "how was it measured?". The ranking system, consisting of seven points, was then used to evaluate the quality of disclosure as follows: 1=monetary, 2=non-monetary, 3=qualitative only, 4=Qualitative and monetary, 5=qualitative and non-monetary, 6=monetary and non-monetary, 7=qualitative, monetary and non-monetary.

For the variable "how was it measured?" the perceived order of importance was attained as follows. The lowest score in this ranking is 1; as information based on monetary information alone would be insufficient for stakeholders to make informed decisions relating to environmental issues of the firm, was considered to be the least informative. The highest score is 7; a firm providing a combination of discussion on environmental goals and objectives, and outcomes in qualitative, non-monetary and monetary terms, was considered to be more meaningful to help stakeholder decisions by linking disclosure, environmental performance and economic performance.

Toms (2002) designed a pilot questionnaire survey sent to fund managers and analysts to test the perceived importance of qualitative environmental disclosures. The results showed that the low rating was given to "non-quantified information" and the high rating was for "externally monitored environmental report". The rating from high rating to low rating was as follows: (1) Externally monitored environmental report, (2) Quantified environmental performance in annual report, (3) Specified policies, (4) Publication of an environmental policy, (5) Volume of information available in reports, and (6) Non-quantified information. Based on the survey results and along the lines suggested by Robertson and Nicholson (1996), each of which increased the credibility of the information, a rating method for corporate environmental disclosures was employed and empirically tested. The rating scale included assigning the following values to varying degrees of disclosure: 0 for "No disclosure", 1 for "General rhetoric", 2 for "Specific endeavor; policy only", 3 for "Specific endeavor; policy specified", 4 for "Implementation and monitoring; use of targets, results not published", and 5 for "Implementation and monitoring; use of targets, results published".

Hooks *et al.* (2002), in identifying the information gap in the annual reports of New Zealand companies, assessed the quality of disclosure from an accountability perspective. A disclosure index was developed using the ideas and opinions of some experts representing broad stakeholder groups. Weightings for each information item were allocated according to the relative importance of those disclosures from an accountability perspective. Accordingly, the following categories were used: 0 = The item should not be disclosed, 1 = Disclosure is of minor importance, 2 = Disclosure is of intermediate importance, 3 = Disclosure is very important, 4, 5 = Disclosure is essential. In this regard, the index measures a stakeholder-oriented disclosure quality.

Milne *et al.* (2003) examined triple bottom line reporting using a benchmark tool produced by the UNEP/SustainAbility group. The benchmark tool comprises 50 reporting items, grouped under the five sections of (1) Management Policies and Systems, (2) An Input/Output Inventory, (3) Finance, (4) Stakeholder Relations and Partnerships, and (5) Sustainable Development. 48 of the 50 reporting items are scored on a scale of 0-4. Two are scored as either 0 or 1. This rating scale is based on the principle that the more complete and comprehensive the information relating to a given reporting item, the higher the score it receives. Essentially each item is being classified into one of 5 possible and mutually exclusive categories as follows: 0=No coverage; 1=Minimum coverage, little detail; 2=Detailed and honest, including company shortcomings and commitments; 3=Commitment to and progress towards sustainable development in core business; 4=Commitment to and progress towards 'triple bottom line' of sustainable development in core business plus benchmarking against competition and/or best practice in other sectors.

Beretta and Bozzolan (2004) proposed a framework for the analysis of a category of voluntary disclosure - that is risk disclosure - that assesses both the quantity and quality of the disclosure. The framework considers four different but complementary dimensions: the content of information disclosed; the economic sign attributed to expected impacts; the type of measures used to quantify and qualify the expected impacts; and the outlook orientation of the disclosure. The content of disclosures is expressed in the form of disclosure categories. The economic sign communicates the direction of the expected impact of risks upon the future performance of the firm while the type of measure used reveals the qualitative or quantitative nature of

disclosure, using either monetary or non-monetary scales. Another dimension of analysis is the outlook orientation which reflects both the time orientation of the information disclosed and the managerial approach to the management of risks.

As far as quantity of communication is concerned, two aspects have to be balanced: the absolute number of pieces of information disclosed (quantity) and the relevance or weight it has inside the overall voluntary communication (density). As far as the quality of communication is concerned, three properties are complementary: the economic sign of the expected impacts and the type of measures used (both of which refer to the depth) and the outlook orientation of the disclosure (outlook profile). The four indices of the proposed dimensions are used to profile the characteristics of disclosure offered by each company. In addition, the indices are synthesized in an overall measure of disclosure quality. However, this measure can be criticized for aggregating quantity and quality into one single measure of disclosure quality. In other words, the measure is based on the notion that the quality of disclosure partially depends on the quantity of information disclosed.

Beattie *et al.* (2004) indicated that there are two principle ways of measuring disclosure: the use of subjective analyst disclosure quality ranking and the use of researcher-constructed disclosure indices where the amount of disclosure is used as a proxy for disclosure quality. Given the limitations and weaknesses of these two approaches, the study introduced a methodology for generating a rich descriptive profile of a company's narrative disclosures. A comprehensive four-dimensional framework for the content analysis of narratives, based on the coding of topic and three type attributes, was developed. The topic analysis is based on the Jenkins report (AICPA, 1994). The type analysis captures the time orientation, financial/non-financial and quantitative/qualitative attributes of the disclosed information.

Moreover, the study made a preliminary attempt to identify some of the attributes of quality and develop a tentative summary measure of disclosure quality. Two dimensions of disclosure quality suggested were the relative amount of disclosure and the spread of disclosures across topics. The standardized residuals from a regression of the number of text units on size and complexity were proposed as a measure of the relative amount of disclosure (as defined as the actual amount relative to the expected amount). A range of measures of the spread were suggested including the Herfindahl

index or a concentration measure calculated at both the main topic level and the sub-topic level as well as a count the number of non-empty sub-topics. The higher the Herfindahl index, the poorer the spread while a higher number of non-empty sub-topics indicates a better spread. The four quality proxies proposed were then combined to create a composite measure of disclosure quality.

Hammond and Miles (2004) conducted interviews with corporate representatives and quality assessors who raised a range of characteristics of quality corporate social reporting including: quantitative disclosure, third party verification, establishment of and reporting against appropriate targets, ‘‘warts and all reporting’’, the adoption of reporting guidelines and standards, the ability to accurately assess performance from disclosure, clear statement of vision from chief executive, good coverage of significant issues, wide access, reporting of normalized data and the achievement of awards/accolades. The study concluded that corporations adopt less comprehensive definitions of quality than quality assessors; quality assessors adopt more stringent definitions of quality than academics; methodological problems of quality assessment highlighted in the academic literature are experienced by quality assessors; and that benchmarking and award schemes are important drivers of corporate social reporting.

Al-Tuwaijri *et al.* (2004) proposed qualitative disclosure measures for assessing the quality of corporate environmental disclosures. First, an analysis was carried out that incorporates disclosures of four key environmental indicators: (1) the total amount of toxic waste generated and transferred or recycled; (2) financial penalties resulting from violations of 10 federal environmental laws; (3) Potential Responsible Party (PRP) designation for the cleanup responsibility of hazardous-waste sites; and (4) the occurrence of reported oil and chemical spills. Second, qualitative disclosure measures denoted weights for different disclosure items, based on the perceived importance of each item to various user groups. The greatest weight (+3) is assigned to quantitative disclosures related to the four environmental indicators described. The next highest weight (+2) is assigned to non-quantitative but specific information related to these indicators. Finally, general qualitative disclosures receive the lowest weight (+1). Firms that do not disclose information for a given indicator receive a score of zero for that indicator. An adjustment was made to the disclosure measure to capture the transparency property of the firm’s environmental disclosure by

measuring the firm's disclosure to investors conditioned on its polluting activity reported to environmental regulators.

Chapman and Milne (2004) examined triple bottom line reporting using a benchmark tool produced by the UNEP/SustainAbility group. The benchmark tool comprises 50 reporting items, grouped under the five sections of (1) Management Policies and Systems, (2) An Input/Output Inventory, (3) Finance, (4) Stakeholder Relations and Partnerships, and (5) Sustainable Development. 48 of the 50 reporting items are scored on a scale of 0-4. Two are scored as either 0 or 1. This rating scale is based on the principle that the more complete and comprehensive the information relating to a given reporting item, the higher the score it receives. Essentially each item is being classified into one of 5 possible and mutually exclusive categories as follows: 0=No coverage; 1=Minimum coverage, little detail; 2=Detailed and honest, including company shortcomings and commitments; 3=Commitment to and progress towards sustainable development in core business; 4=Commitment to and progress towards 'triple bottom line' of sustainable development in core business plus benchmarking against competition and/or best practice in other sectors.

Hasseldine *et al.* (2005) used the rating method for assessing corporate environmental disclosure quality as that employed by Toms (2002). However, the data set was extended to create a quality-adjusted measure of disclosure quantity. Quality scores were first identified by sentence according to the scheme described by Toms (2002). The best example was used to score the signal of each company. The quality score for every sentence in each report was then added to compute an aggregate measure. The following categories were used in the 0–5 qualitative scale. No disclosure=0; general rhetoric=1; specific endeavour; policy only=2; specific endeavour or intent, policy specified=3; implementation and monitoring, use of targets references to outcomes, but quantified results not published=4; implementation and monitoring; use of targets, quantified results published=5. Some further refinement was made. Lead in sentences, without reference to the environment in themselves, but introducing environmental content, were counted as zeros. Policy specification (3) and implementation and monitoring statements (4) were distinguished further so that statements of intent were scored at 3 and statements of achievement were scored at 4. The 0–5 qualitative scale list reflected these refinements.

Van der Laan Smith *et al.* (2005) used a multi-method approach to measure the quality of the corporate social disclosure in annual reports of US companies. Following Patten (1995), the authors used the presence of numeric data in social disclosure as a proxy to assess disclosure quality. The numeric information variable identified financial as well as non-financial information items. Numeric data - as argued by the authors - provide additional information to the reader. This disclosure quality measure was corroborated by a qualitative assessment of disclosure quality categorizing the information provided as proactive or reactive, as discussing future events or past events and as informational or promotional. According to the study, social disclosure that was proactive, discussed future events and informational is considered as being higher quality disclosures than social disclosure that was reactive, historical, or promotional in nature.

Van Staden and Hooks (2007) developed an index of 5-point scale to assess the quality of environmental disclosure. First, environmental disclosure items were arranged into the following six categories: the entity, management policy and systems, environmental impacts, stakeholders, financial impacts, and general. Most of the disclosures were then scored on the 5-point scale using the following criteria: 0 Not disclosed, no discussion of the issue; 1 Minimum coverage, little detail-general terms. Anecdotal or briefly mentioned; 2 Descriptive: the impact of the company or its policies was clearly evident; 3 Quantitative: the environmental impact was clearly defined in monetary terms or actual physical quantities; and 4 Truly extraordinary; 5 Benchmarking against best practice. This resulted in a total possible score of 100.

Gibson and O'Donovan (2007) simply analyzed the quality of environmental disclosures in annual reports in terms of the nature of the information provided. The information was separated into the three categories, namely financial, quantifiable non financial and descriptive. Financial disclosure is included in the financial statements including notes to the accounts (e.g. provision for future clean up costs). Quantifiable Non Financial disclosure is included in the annual report but not part of the financial statements (e.g. graphs or tables indicating emissions to the air or water). Descriptive disclosure refers to narrative and pictorial forms of disclosure (e.g. often textual references in directors' report or stand alone social and environmental sections of the report). The total amount of environmental information disclosed (number of pages)

in each annual report and in each category was aggregated. The total length of each annual report and each disclosure category was then expressed as a percentage of the total number of pages in the report.

Raar (2007) examined the quality of environmental and social information disclosed in the annual reports drawing heavily on Raar (2002). Disclosure items were measured by monetary, non-monetary, qualitative discussion or a combination of all three. A ranking system, consisting of seven points, was used to evaluate the quality of disclosure as follows: 1=monetary, 2=non-monetary, 3=qualitative only, 4=Qualitative and monetary, 5=qualitative and non-monetary, 6=monetary and non-monetary, 7=qualitative, monetary and non-monetary. For information quality definitions, the highest ranking was given to firms who made the effort to combine measurements, for example, qualitative prose; non-monetary measurement, for example, tones of waste; and also use of monetary terms. The basis for this ranking was that firm's could more readily provide benchmarks in monetary or non-monetary terms, and then use this to compare with actual performance. The study claims that this approach is considered to be of more value to the user.

Grüning (2007) investigated corporate disclosure quality in annual reports. Disclosure was first grouped into seven categories. For each of the seven communication dimensions a comprehensive list of items that could potentially be considered in disclosure is used. For each item the quality of information provided is evaluated using a scoring model. The scale consists of five values with 1 point for minimal information and 5 points for detailed and forecast information. If there is no information available for a particular item, no points will be allocated. For each item there is a clear definition for what information to assign the different values as follows: 1 point: general description; 2 points: qualitative information; 3 points: additional qualitative information on future development; 4 points: additional growth rate development, including forecast; 5 points: additional prognosis on future development and time series analysis of past data. As the information quality scales for each communication dimension should be equal to obtain comparable results data have to be rescaled to fit into an interval between 0 and maximum points. Hence, the maximum points represent the observed best practice for each dimension after rescaling.

Beretta and Bozzolan (2008) proposed a framework for the analysis of a category of voluntary disclosure - that is forward-looking disclosure - that assesses the quality of the disclosure. The study contended the need for an adoption of a multidimensional disclosure framework that jointly considers not only the "quantity" of disclosure (how much is disclosed) but also the "richness" of disclosure (what and how it is disclosed). The "quantity" dimension is measured by the relative number of disclosed items, adjusted for size and industry. "Richness" is defined as a function of the coverage of and dispersion among the different topics that qualify a firm's business model (width) and of the insights disclosed on the future performance of the firm (depth).

"Width" depends both on the coverage of relevant topics (or subtopics) of the framework and on the dispersion of disclosure across different topics (or subtopics). Coverage is measured by the percentage of topics (subtopics) filled in by at least one piece of information out of the total number of topics (subtopics) considered. The wider the variety of topics disclosed the better. Dispersion of disclosure refers to how concentrated disclosed items are. "Depth" synthesizes the economic sign, type of measure, and outlook profile of disclosed information. The economic sign (positive, negative, not disclosed) communicates the economic direction of the impact (observed or expected) on the firm's performance of the disclosed items. The type of measures (financial versus non-financial; quantitative versus qualitative; not disclosed) qualifies the content of a disclosure. The outlook profile reflects the time orientation of the information disclosed as well as management's orientation to action.

Clarkson *et al.*'s (2008) developed an index to measure the quality of voluntary environmental disclosures based on indicators from the internationally accepted GRI Guidelines with the help of an expert in environmental reporting, a member of the GRI Steering Committee from its inception. According to the Guidelines, quality reporting reflects a balance of information reported (both positive and negative) as well as comparable, accurate, and reliable information. Environmental disclosures are categorized into seven broad categories. The first four categories represent hard disclosures and the remaining three categories represent soft disclosures. The relative weighting of hard compared to soft disclosures reflect the GRI's focus on hard disclosures. Hard disclosure items assess the environmental commitment of companies in an objective manner. These categories score environmental disclosures

on aspects of governance structure and management systems, credibility, environmental performance indicators and environmental spending. Companies committing themselves to environmental protection are able to score higher on hard disclosures compared to those companies with less true commitment to protect the environment. On the other hand, soft disclosure items mostly refer to claims by management about their environmental initiatives. These categories represent vision and strategy claims, environmental profile and environmental initiatives, all of which could be copied by companies with no true commitment to protect the environment.

Plumlee *et al.* (2009) proposed an index to examine the quality of a firm's voluntary environmental disclosures. Following the approach of Clarkson *et al.* (2008), the Global Reporting Initiative's (GRI) framework, which provides voluntary environmental reporting standards, is the basis of the index developed. The standards are based on a set of reporting principles important to analysts and investors, including transparency, materiality, relevance, and reliability. The content and structure of the quality index follows GRI standards, including sections on: firm vision and environmental strategy, environmental governance structure, environmental management systems, and environmental results. The index relied on GRI reporting standards to identify environmental indicators relevant for firm reporting. Multiple relevant aspects of each indicator were identified to improve the ability of the index to capture quality. Each indicator and aspect was identified as either present or absent; indicators were not evaluated as being positive or negative.

Moroney *et al.* (2009) adapted the Clarkson *et al.* (2008) environmental disclosure index to measure disclosure quality, which uses the GRI as its base. The GRI Guidelines offer a detailed listing of core performance indicators to aid in the preparation of sustainability reports comprising economic, environmental and social elements. Clarkson *et al.* (2008) index reflects the spirit of the GRI guidelines. The scoring model contains equally weighted disclosure items. Seven categories are used with four categories comprising hard disclosures and three categories comprising soft disclosures. 'Hard' disclosures assess the environmental commitment of companies in an objective manner. They include governance structure and management systems, credibility, environmental performance indicators and environmental spending. 'Soft' disclosures include the management's claims about their environmental initiatives,

such as vision and strategy, environmental profile and environmental initiatives. Most items in Clarkson *et al.* (2008) index relate to hard disclosures as reflected in the GRI guidelines because these disclosures indicate a stronger commitment by companies to protect the environment. However, the Clarkson *et al.* (2008) index was developed for use in a US context, where some of the items classified as being voluntary could be classified as mandatory within the Australian regulatory framework. But results were found not to be sensitive to the inclusion of these items in the analysis. The item "The presence of independent verification or assurance on environmental information disclosed" was removed when measuring voluntary environmental disclosure because this study's aim is to investigate whether environmental assurance enhances the quality of voluntary environmental disclosures.

Bozzolan *et al.* (2009) proposed a framework for the analysis of a category of voluntary disclosure - that is forward-looking disclosure - that assesses the quality of the disclosure. The framework considers different quality dimensions: the content and the characteristics of information disclosed. Two different measures of forward-looking disclosures were used. The quantity of forward-looking disclosure provided by the company is defined in absolute terms by counting the number of sentences including forward-looking information. The second measure, expressed in relative terms, is the number of sentences containing forward-looking information divided by the maximum extent of forward-looking disclosures offered by the company.

Disclosure was analyzed according to its characteristics: the economic sign that communicates the direction of the expected impact upon the future performance of the firm and the measures used in order to quantify/qualify the expected impact. A sentence is codified as financially verifiable forward-looking information when it contains the expected impact on future performance and a measure of this impact. Each disclosed sentence was associated with a vector that can take five different values:

- (0, 0, 0) if the sentence does not contain forward-looking information;
- (1, 0, 0) if the sentence contains forward-looking information but does not offer indication of the expected impact and does not disclose a measure;

- (1, 1, 0) if the sentence contains forward-looking information and offers indication on the expected impact but does not disclose a measure;
- (1, 0, 1) if the sentence contains forward-looking information and discloses a measure but does not offer indication of the expected impact on future performance;
- (1, 1, 1) if the sentence contains forward-looking information, its expected impact of future performance disclosing also a measure.

As a result, the score for the disclosure offered by each is the sum of the vectors representing the score for each sentence.

Moneva and Cuellar (2009), in analyzing the value relevance of different types of financial and non-financial environmental disclosures, introduced an important issue that affects the quality and homogeneity of environmental information, namely, whether the disclosure of the measurements employed is voluntary or obligatory. Environmental disclosures were classified into five items: policy, environmental management systems, environmental assets, environmental expenditures and environmental liabilities and contingencies. Two additional exogenous financial measures were included, namely investment in R&D activities and the age of the assets of the firm. In order to separate the disclosure into voluntary and mandatory, the study differentiated between a period in which the information is voluntary and another in which it is obligatory, establishing the assumption that the introduction of mandatory reporting mechanisms may ensure relative uniformity in reporting practices and provide minimum disclosure.

Mouselli and Hussainey (2010) adopted the measure of disclosure quality developed in Hussainey *et al.* (2003). Their measure of disclosure quality is the number of future orientated statements in corporate annual report narrative sections that contain earnings-related topics. The disclosure measure focuses on earnings indicators because the authors claim that these indicators increase the stock market's ability to foresee future earnings change. The disclosure score was estimated in three steps. In the first step, the narrative sections of annual reports were searched for future orientated information using a list of thirty-five keywords. In the second step, the relevant information to the stock market in assessing the firm's future earnings were

identified using a list of twelve keywords related to earnings indicators. Finally, QSR N6 was used to count the number of sentences that include both at least one future orientated keyword and at least one earnings indicator.

Sun *et al.* (2010) examined the quality of corporate environmental disclosure in the annual reports of UK companies. Disclosure scores are given to different environmental information items based on the degree to which companies are disclosing the core KPIs in accordance with the UK Government's Environmental Key Performance Indicators (KPI) – Reporting Guidelines for UK Business. Accordingly, disclosures were classified as follows: 0 = no quantification; 1 = general quantification; 2 = data that could be derived to meet Government Guidelines; and 3 = disclosure that meets Government Guidelines. In this regard, the study - as argued by the authors - is reflecting on the recent claim by the UK government that environmental reporting is a significant element of corporate reporting.

Plumlee *et al.* (2010) examined the quality of a firm's voluntary environmental disclosures for a sample of US firms across five industries. Voluntary environmental disclosure quality is measured using a disclosure index similar to the index used in Clarkson *et al.* (2008) that is consistent with the Global Reporting Initiative disclosure framework. In addition to overall disclosure quality, the study also considered the type (i.e. hard/soft) and the nature (i.e. positive/neutral/negative) of the disclosure in the analysis of a firm's voluntary environmental disclosures. Disclosure items were classified as Hard (Soft) based on whether that are objective (subjective). However, classifying disclosures as positive/neutral/negative is based on the general type of environmental information rather than a classification of the firm response. The authors argue that the good/bad/neutral classification, that is based on whether the disclosure reflect increases/decreases/no change relative to prior earnings, makes it difficult to determine how the information disclosed should be classified without a baseline to use as comparison.

Delmas and Blass (2010) used a methodology for the analysis of the content of environmental disclosure in corporate annual reports and websites as that developed by Brammer and Pavelin (2006). It consists of the aggregation of the following seven indicators to represent the quality of companies' corporate environmental disclosure: (1) Does the firm publish an environmental or sustainability report?; (2) If yes, is it

according to the Global Reporting Initiative guidelines?; (3) Has the CEO/president signed the environmental policy?; (4) Transparency and ease of obtaining information measured using the number of clicks from home page needed in order to read the environmental information or policy. (5) Does the firm have specific and clear goals and improvement targets? (6) Does the firm report actual performance numbers or just relative numbers? (7) Are the firm's reported numbers verified by a third party?

In addition, the environmental reporting score measurement of the Pacific Social Index, developed by the Roberts Environmental Center (REC) at Claremont McKenna College, was used. The REC combines qualitative and quantitative measurements to examine the quality of environmental reporting using measures similar to the ones used in the previous analysis. These include the description of environmental issues and initiatives to address these issues, the existence of measurement metrics, explicit numerical goals and recognition from third parties. The score is based on the percentage of issues that were covered and how well they were covered.

Eugster and Wagner (2011) used a direct measure of the voluntary disclosure quality of a company. An annual value reporting rating, conducted by the Department of Banking and Finance of the University of Zurich, was used as a measure of voluntary disclosure quality. The disclosure quality was assessed using a scorecard with over 100 questions aggregated into 35 items in 9 sub-indices/categories, which are thought to be important for the decision-making process of an investor. The total score of the ranking is a straightforward summation of the checklist with 35 items, which are graded (1 = no information; 6 = very high information quality) based on the information content and quality. The currently required disclosure level was specified on the checklist that assessors use to rate companies. The ratio of the number of reached points over the number of total reachable points was used as a measure of voluntary disclosure quality.

Glaum *et al.* (forthcoming, 2011) measured disclosure quality with data from a yearly annual-report competition. In order to assess the quality of disclosures, data from an assessment of financial reports that takes place annually in Germany within the framework of a competition for "the best annual report" were used. On the basis of a comprehensive check list including more than 300 criteria, each annual report is assessed by analysts who have been specially trained for this evaluation. In the course

of the evaluation it is determined whether the information has actually been reported by the companies and in how much detail it has been reported. In other words, the quantity and the detail of the information published by the company are decisive for the quality rating. Individual items on the check list are weighted with factors that were determined in the course of interviews with and questionnaire surveys.

To supplement the information supplied by the annual report, which is in large part related to the past, the management report is thus obliged to provide future-oriented details that are potentially of great interest to investors and analysts. The quality of the reports is judged not only on the quantity of information provided, but also on whether reports contain only general verbal information or comparative information, quantitative ranges of values or precise point estimates. As in all scoring and ranking procedures, data from annual-report contests are based in part on subjective judgments and weighting. However, the authors claim that, in comparison with alternative measures, they have two advantages: they enable direct measurement of quality, and they are consistently gathered by independent scientists over relatively long periods of time.

Magness and Bewley (2011), in examining environmental reporting, used the disclosure-rating tool developed and used in the Clarkson *et al.* (2008) study. This tool was based upon the Global Reporting Initiative, a reporting framework developed by a joint group consisting of the Coalition of Environmentally Responsible Economies and UN Environmental Program. This GRI-based disclosure scale has a total of 45 items, each of which is assigned to one of seven categories. Categories include four sections of hard disclosure items including information related to governance, credibility, environmental performance indicators, and environmental spending. The authors argued that hard disclosure are types of information that are more likely to be used as quality signals because they cannot be easily mimicked by low quality companies without incurring considerable cost. The remaining sections include information about environmental vision, profile, and initiatives. These three sections are classified as soft information disclosures because they include broad claims that lack substantiation and can therefore be easily mimicked by other companies.

Acerete *et al.* (2011) investigated mandatory rather than voluntary environmental information in Spain. Environmental items analyzed included: Note about accounting criteria; Note about environmental items (Description of environmental assets; Measurement of environmental assets, Amortization of environmental assets, Annual environmental investment, Environmental expenditures, Description of environmental provisions, Measurement of environmental provisions, Transfer to environmental provisions, Application of environmental provisions, Environmental contingencies, Environmental liabilities); Environmental information in management reports. The items in the checklist enable focusing on qualitative features of the information. An environmental disclosure index was constructed for the concessionaires for each year. Each environmental reporting item is scored one if it was reported in the notes to the financial statements and zero if not. The index is computed by adding the scores of each item dividing this by the sum by the maximum number of items. If there is no information available about an item, but it is specifically mentioned in the notes to the financial statements, it is scored 0.5. This index allows assessment of the evolution of the environmental reporting of the companies.

Siddique *et al.* (2011) defined the quality of disclosure in terms of relevance or what to report. Relevant environmental disclosure constitutes: a) information on the impact of organizational activities on natural environment and b) the consequences of the community perception of such impact on financial and operational activities of the organization. This definition is guided by Global Reporting Initiative (GRI) G3 guidelines; Global Climate Disclosure Framework; and Climate Disclosure Standard Board Framework. A list of relevant environmental disclosure included: (1) Disclosure on strategy (identifying challenge; identifying business impact; setting performance target) and (2) Disclosure on impact and performance (material, water and energy use; pollution: emission/effluents and waste; product and service; transport; Compliance to environmental regulation). The list implies that environmental information is relevant when it provides information on the company's impact on natural environment including use of resources and pollution, and the company's strategy in identifying risks and opportunities results from such impact.

Liu *et al.* (2011) investigated environmental disclosure using the methods and criterions of international environmental performance evaluation. Environmental

disclosure level is evaluated by using index method. Full score is 100. The first part is 75, in 25 indexes. All indexes are equally-weighted. The highest score of each index is 3. Each index is valued score of 0, 1 and 3. 0 represents no disclosure information, 1 represents only a little description of the index, 3 represents the index is detailed described. The full score of the second part is 25. Disclosure forms including Environmental disclosure (social responsibility report) reports and environmental information descriptions. If a listed company discloses the independent corporate environmental report, it can earn 10. Otherwise, it gets 0. Within the regulation of paragraph description, if there is an independent description, it is recorded the score of 3. By this kind of analogizes; the highest description of each paragraph is 15.

Clarkson *et al.* (2011) adopted the same voluntary environmental disclosure index developed by Clarkson *et al.* (2008). They developed a voluntary environmental disclosure quality index based on the Global Reporting Initiative framework and the advice of a GRI expert. The standards are based on a set of reporting principles important to analysts and investors, including transparency, materiality, relevance, and reliability. The content and structure of the quality index follows GRI standards, including sections on: firm vision and environmental strategy, environmental governance structure, environmental management systems, and environmental results. The first four categories represent hard disclosures and the remaining three categories represent soft disclosures. The relative weighting of hard compared to soft disclosures reflect the GRI's focus on hard disclosures.

Table 2.5

Empirical Studies On Corporate Disclosure Quality Measurement

Author(s) & Date	Type of Disclosure	Type of Quality Measure
Wiseman (1982)	Environmental disclosures	Researcher-constructed disclosure index
Guthrie and Matthews (1985)	Social responsibility disclosure	Researcher-constructed disclosure index
Freedman and Stagliano (1992)	Social disclosures	Researcher-constructed disclosure index
Patten (1995)	Social disclosure	Researcher-constructed disclosure index
Gray *et al*. (1995b)	Social and environmental reporting	Researcher-constructed disclosure index
Gamble *et al*. (1995)	Environmental disclosures	Researcher-constructed disclosure index
Robertson and Nicholson (1996)	Social responsibility disclosure	Researcher-constructed disclosure index
Walden and Schwartz (1997)	Environmental disclosure	Researcher-constructed disclosure index
Hughes *et al*. (2001)	Environmental disclosures	Researcher-constructed disclosure index
Raar (2002)	Environmental disclosure	Researcher-constructed disclosure index
Toms (2002)	Environmental disclosure	Researcher-constructed disclosure index
Hooks *et al*. (2002)	General disclosure	Researcher-constructed disclosure index
Milne *et al*. (2003)	Triple bottom line reporting	Analyst disclosure quality ranking
Beretta and Bozzolan (2004)	Risk disclosure	Researcher-constructed disclosure index
Beattie *et al*. (2004)	Voluntary disclosure	Researcher-constructed disclosure index
Hammond and Miles (2004)	Social reporting	Researcher-constructed disclosure index

Author(s) & Date	Type of Disclosure	Type of Quality Measure
Al-Tuwaijri *et al*. (2004)	Environmental disclosure	Researcher-constructed disclosure index
Chapman and Milne (2004)	Triple bottom line reporting	Analyst disclosure quality ranking
Hasseldine *et al*. (2005)	Environmental disclosure	Researcher-constructed disclosure index
Van der Laan Smith *et al*. (2005)	Social disclosure	Researcher-constructed disclosure index
Van Staden and Hooks (2007)	Environmental disclosure	Researcher-constructed disclosure index
Gibson and O'Donovan (2007)	Environmental disclosure	Researcher-constructed disclosure index
Raar (2007)	Environmental and social disclosure	Researcher-constructed disclosure index
Grüning (2007)	General disclosure	Researcher-constructed disclosure index
Beretta and Bozzolan (2008)	Forward-looking disclosure	Researcher-constructed disclosure index
Clarkson *et al*. (2008)	Voluntary environmental disclosures	Researcher-constructed disclosure index
Plumlee *et al*. (2009)	Voluntary environmental disclosures	Researcher-constructed disclosure index
Moroney *et al*. (2009)	Environmental disclosure	Researcher-constructed disclosure index
Bozzolan *et al*. (2009)	Forward-looking disclosure	Researcher-constructed disclosure index
Moneva and Cuellar (2009)	Environmental disclosures	Researcher-constructed disclosure index
Mouselli and Hussainey (2010)	General disclosure	Researcher-constructed disclosure index
Sun *et al*. (2010)	Environmental disclosure	Researcher-constructed disclosure index
Plumlee *et al*. (2010)	Voluntary environmental disclosures	Researcher-constructed disclosure index
Delmas and Blass (2010)	Environmental disclosure	Analyst disclosure quality ranking

Author(s) & Date	Type of Disclosure	Type of Quality Measure
Eugster and Wagner (2011)	Voluntary disclosure	Analyst disclosure quality ranking
Glaum *et al*. (forthcoming, 2011)	General disclosure	Analyst disclosure quality ranking
Magness and Bewley (2011)	Environmental reporting	Researcher-constructed disclosure index
Acerete *et al*. (2011)	Mandatory environmental disclosure	Researcher-constructed disclosure index
Siddique *et al*. (2011) *al*.	Environmental disclosure	Researcher-constructed disclosure index
Liu *et al*. (2011)	Environmental disclosure	Researcher-constructed disclosure index
Clarkson *et al*. (2011)	Voluntary environmental disclosure	Researcher-constructed disclosure index

2.7 DISCUSSION OF PRIOR RESEARCH: LITERATURE GAP

Corporate environmental reporting has been widely discussed by academic research for more than four decades. The development of environmental accounting and reporting has created a space for the researchers to study how organizations can benefit from this interaction with the society, i.e. the value relevance of environmental activities (Gray, 2010). With the growing importance of the environmental issues in the business transactions, companies started implementing a focused strategic management approach in environmental practices (Roy and Ghosh, 2011). These corporate practices induce researchers to quantify the value relevance of this environmental management system.

A considerable body of literature from a wide range of theoretical backgrounds concluded that environmental disclosures are an important phenomenon employed by corporations (Gray *et al.*, 2001) and are influenced by a variety of explanatory factors.

Adams (2002) indicated that an understanding of the factors which influence disclosure is necessary for improving accountability and specifically:

- The extensiveness of reporting,
- The quality and quantity of reporting by individual companies,
- The completeness or comprehensiveness of reporting (by understanding the reasons for non-disclosure), and
- The disclosure of critical analysis of the (potential) role of legislation in achieving improvements in the abovementioned areas.

However, the assessment of environmental disclosures quality remains a rather controversial issue. Several attempts have been made in the accounting literature to measure disclosure quality. Two approaches of quality assessment commonly employed are the use of subjective analyst disclosure quality rankings and the use of researcher-constructed disclosure indices (Beatti *et al.*, 2004). Each of the two approaches, and even the different measures developed under each approach, may have their respective strengths and weaknesses in capturing the necessary data for addressing stakeholders' interests and satisfying their information needs. Nevertheless, the growing importance of narrative disclosures in financial reporting gives the question of disclosure quality measurement a different perspective, while bearing in mind that disclosure quantity generally has an implication in determining disclosure quality (Beretta and Bozzolan, 2008). Such perspective shifts the issue of disclosure quality from volumetric measurement to semantic assessment. This shift in disclosure quality assessment is argued to have the advantages of permitting the benchmarking of current disclosure practices, allowing comparisons to be made among different companies, industries and countries and allowing changes over time to be monitored as well as permitting more powerful investigation of narrative disclosure issues (Beatti *et al.*, 2004).

Prior literature regarding the relationship between corporate environmental disclosure and each of corporate governance mechanisms and corporate characteristics suffers from a number of well-known limitations that contribute to the inconsistency and inconclusiveness of existing findings. While these studies draw conclusions as to organizations' environmental commitment based largely on the amount of disclosure,

they rarely considered the actual content of what is being disclosed. Overcoming the limitations inherent in previous studies would significantly enhance research in this area. Following is a detailed analysis and critical evaluation of empirical studies investigating the impact of corporate characteristics and corporate governance mechanisms on the quantity and quality of corporate environmental disclosure as well as disclosure quality assessment issues. Analysis of previous studies is aimed at identifying any gaps in the literature and presenting a preliminary introduction to the present study. Accordingly, these studies are analyzed and evaluated in terms of their contribution to the present study and the relationship between previous studies and the present study is highlighted.

First, and most important, is the limited prior research specifically investigating the relationship between each of the quantity and the quality of corporate environmental disclosure and corporate governance. Although previous research has acknowledged that good corporate governance is associated with increased transparency and credible disclosure (see Ajinkya *et al.*, 2005; Cormier *et al.*, 2010; Dunstan, 2008; Gul and Leung, 2004), little attention has been dedicated to the impact of corporate governance mechanisms on environmental disclosure practices. Prior empirical studies into factors which are influential in determining the extent and quality of corporate social and environmental reporting has primarily been concerned with the impact of corporate characteristics (such as size, industry grouping and financial performance) or general contextual factors (such as the social, political and economic context), while relatively little prior work has examined the internal contextual factors (corporate governance mechanisms) influencing disclosure practices (Adams, 2002).

The principles of corporate governance established by the Organization for Economic Cooperation and Development (OECD) set out a framework for good practice, and constitute a set of voluntary recommendations for corporations in all the major areas of business ethics, including environment and information disclosure. A company implementing OECD guidelines on corporate disclosure should consider undertaking a certain amount of environmental reporting (OECD, 2004). Accordingly, corporate governance plays an important role in determining the disclosure required for satisfying the information needs of various stakeholders as it is the board of directors that manages information disclosure in annual reports (Gibbins *et al.*, 1990; Haniffa

and Cooke, 2005). Hence, it is possible that failure to include corporate governance characteristics could account for the inconsistency and inconclusiveness characterizing the results of corporate social and environmental disclosure studies (Gul and Leung, 2004). The main objective of the present study is to empirically examine the relationship between corporate governance and the quantity and quality of corporate environmental disclosures in UK companies, while controlling for corporate characteristics.

In addition, the majority of previous studies have adopted an aggregated view of environmental disclosures rather than disaggregating disclosures into main themes or categories (Campbell, 2004). Although these studies included some sort of classification scheme of environmental disclosures, they did not separately identify such disclosure groupings or individually incorporate them into empirical analyses (see for example, Brammer and Pavelin, 2006; Deegan and Gordon, 1996; Deegan and Rankin, 1996; García-Ayuso and Larrinaga, 2003; Post *et al*., 2011; Stanny and Ely, 2008). While a composite or summary measure, that collapses different disclosure categories into a single value, is useful in associating disclosure quantity with other variables of interest, the analysis of the different disclosure categories provide deeper understanding of and richer insights into disclosure quantity (see Beattie *et al*., 2004), thereby help to comprehensively profile the disclosure strategies adopted by the company (Beretta and Bozzolan, 2004). Aggregated measures shift attention away from what is and what is not being reported in terms of the different themes or items being reported (Chapman and Milne, 2004). Accordingly, the current study distinguishes between the different categories or areas of activity to which the environmental disclosure relates including environmental policies, environmental product and process-related, regulatory compliance, environmental auditing, sustainability and other environmentally-related information.

There is no prior research to date into the relationship of corporate environmental disclosure and corporate governance that uses comprehensive governance indicators or that thoroughly examines the relationship in a complete manner. These studies have been limited to the effects of firm ownership and board structure as explanatory factors. More specifically, they examined different ownership forms, the proportion of independent directors, board size, role duality and the existence of an audit

committee. According to Ho and Wong (2001) however, previous studies that examine the impact of corporate governance on environmental disclosure analyzed the effect of one single corporate governance attribute and very few of them examined different governance attributes in a single study (e.g. Haniffa and Cooke, 2002; Rupley *et al.*, 2011). Based on the idea that the corporate governance system is the result of a series of interrelated characteristics, all of which are relevant to ensure sound governance, environmental disclosure should be analyzed in the context of a collection of corporate governance mechanisms. Conducting extensive field work is thus important to better understand, document and operationalize corporate governance variables (Zahra and Pearce II, 1989). Therefore, the present study provides a comprehensive representation of corporate governance by incorporating several corporate governance mechanisms into examining the impact on corporate environmental disclosure practices.

Although some studies have examined the relationship between corporate voluntary disclosure and corporate governance, very few of them have been conducted in the UK. Only two UK studies (Brammer and Pavelin, 2006; 2008) - as far as I am aware - have specifically investigated the impact of corporate governance on voluntary environmental disclosure. Therefore, prior UK studies to date have not comprehensively addressed the potential impact that corporate governance variables may have upon environmental disclosure practices. The findings of the studies conducted in other countries are not at all relevant to be generalized to the UK community. There are quite striking differences across these countries. Differences exist with respect to culture; accounting systems; banking and finance systems; government and legislative systems; and the attitudes of society towards the legitimate roles of companies and the extent to which they should be held responsible for the environmental impacts of their activities (Gray *et al.*, 1996; Guthrie and Parker, 1990; Patten, 1995). It is therefore considered useful to expand corporate environmental responsibility disclosure literature by providing further UK evidence on the relationship between corporate governance mechanisms and environmental disclosure practices. The present study examines such relationship within the British context.

A second major criticism of previous literature on corporate environmental responsibility disclosures is that the results tend to be inconsistent and/or inconclusive. Inconsistency may be attributed to (a) a lack of theory, (b) diversity of empirical databases examined and (c) the absence of a single conceptual framework to analyze the required relationships (Belkaoui and Karpik, 1989). A major flaw lies in the lack of any explicit comprehensive environmental responsibility theory underpinning the analysis performed and sufficient to explain why corporations engage in social responsibility endeavors (Roberts, 1992). The probability of still insufficiently specified theories exist (Gray *et al.*, 2001). The diversity of empirical databases examined refers to the use of different samples of firms, the focus on different years and different time spans, the use of different control variables, and the use of different dimensions and proxies for the dependent and independent variables (Gray *et al.*, 1996). Finally, failure to analyze the required relationships within a single conceptual framework contributes to the diversity of the results. Research on corporate social responsibility lacks a dominant paradigm because different researchers have heterogeneous backgrounds and thus are influenced by different values and ideologies (Orlitzky *et al.*, 2011).

Inconclusiveness of previous research showing controversial and mixed results may be attributed to several reasons including differences in socio economic and political environments between countries, organizational structures, construction of the informational items in disclosure indices and sampling error (Ahmed and Courtis, 1999). An example would be the mixed evidence that board structure affects environmental disclosure. Halme and Huse (1997) found that board of director factors are positively related to differences in corporate environmental reporting. Barako *et al.* (2006) found that board composition is negatively associated with voluntary environmental disclosure as did Haniffa and Cooke (2005). However, Brammer and Pavelin (2006) found no significant relationship at all between the likelihood of making voluntary environmental disclosure and the number of non-executive directors. In fact, the few studies in this area have provided counterintuitive and unexpected results (Cheng and Courtenay, 2006). Existing evidence regarding the influence upon the propensity for firms to make voluntary environmental disclosures suffers from well-known limitations (Patten, 2002; Ullmann, 1985) that contribute to the inconclusiveness of existing findings (Gray *et al.*, 2001). These limitations

concern the dimensions, types and proxies of each of the dependent variables and independent variables, the different control variables and their proxies, the sample size and type, the years and time spans, and the method of estimating relationships.

Most earlier studies used the volume of disclosure as the dependent variable (Cowen *et al.*, 1987; Patten, 1991; Haniffa and Cooke, 2002; Halme and Huse, 1997, Gul and Leung, 2004; Huafang and Jianguo, 2007) instead of a scoring system (Magness, 2006). While volume of discussion may reflect the emphasis management places on a particular topic, it fails to capture the subtle issues inherent in management strategy (Neu *et al.*, 1998). Focusing on the quantity of disclosures, however, does not mean that such disclosures are of higher quality so as to reflect the true state of the company's disclosure strategies (Ho and Wong, 2001). Hence, more disclosures do not necessarily imply more quality disclosures. Even most of the few studies that differentiated between the quantity and quality of disclosures (e.g. Magness, 2006; Mio, 2010) did not employ corporate governance characteristics as explanatory variables of environmental disclosures. Still the very few studies investigating the quality of environmental disclosure and incorporating corporate governance measures into the analysis (e.g. Brammer and Pavelin, 2008) failed to explicitly distinguish between the qualitative characteristics of the information disclosed.

Another point to be considered in the quantity versus quality issue of environmental disclosures would be the independent focus upon each individual indicator of quality rather than an aggregated measure of quality. This would permit insight into whether indicators are complements or substitutes, as well as revealing the extent to which each is associated with particular corporate governance characteristics (Brammer and Pavelin, 2006). Therefore, a more refined and detailed measure and classification base that distinguish between various degrees and dimensions of environmental reporting should be used. The analysis of the different quality dimensions provide deeper understanding of and richer insights into disclosure quality (see Beattie *et al.*, 2004), thereby help to comprehensively profile the disclosure quality strategies adopted by the company (Beretta and Bozzolan, 2004). Using content analysis, the present study attempts to develop a broadly defined disclosure quality index in line with the international accounting standards framework that captures the distinct nature of disclosure items and that distinguishes the different types of information content. The

development of an overall index encompassing the different qualitative characteristics of the information disclosed would be a major contribution of the present study that overcomes one critical limitation of prior research.

Previous studies are often criticized for their samples. The samples analyzed have tended to be small and homogeneous. In other words, the samples included a small number of companies to be examined and restricted in diversity in both the size of the companies and their industrial composition (Brammer and Pavelin, 2006). Such samples ignore the contribution of boards in different types of firms to corporate performance (Zahra and Pearce II, 1989) and, hence, to disclosure practices. Specifically, empirical studies have focused upon the largest companies (e.g. Adams, 2002; Gray *et al.*, 2001; Guthrie and Parker, 1990), or those companies belonging to environmentally sensitive or high profile industries (e.g. Freedman and Jaggi, 1988; Gamble *et al.*, 1995; Neu *et al.*, 1998). The results of such studies are therefore less reliable and certainly cannot be generalized over the whole population. Accordingly, the sample used in the present study is the FTSE All-Share Index, which is the broadest index of UK listed companies. The use of a large and industrially diverse sample permits a more comprehensive exploration of the impact of the different corporate governance characteristics upon corporate environmental disclosures.

In addition, the importance of time seems to be overlooked in existing literature. Almost all prior studies examining the determinants of corporate environmental disclosure are mainly cross-sectional in nature investigating the relationship over one year only (e.g. Adams, 2002; Brammer and Pavelin, 2006) except for very few studies (e.g. Barako *et al.*, 2006; Campbell, 2004; Gray *et al.*, 2001). No literature to date - as far as I am aware - has conducted any systematic longitudinal analysis of corporate environmental disclosure and corporate governance mechanisms within the UK. If such relationships exist, they may well only be revealed over time as they may prove to be unstable from year to year (Gray *et al.*, 2001) or even from event to another within the year. Therefore, a longitudinal study on a yearly basis that can trace the disclosure practices over several years may help provide insights into the relationship in question. Moreover, it will help trace the trend of disclosure and the impact of corporate governance against the background of environmental and economic development in the country (Haniffa and Cooke, 2005). In an attempt to address the

empirical deficit in UK environmental disclosure studies, the present study sets out to define its sample both in longitudinal and cross-sectional perspective, over 2004-2007 inclusive, so as to provide a contribution to the literature on determinants of environmental reporting of UK companies. Longitudinal analysis would help to resolve issues concerning causality and shed more light on the evolving pattern of the environmental disclosures (Brammer and Pavelin, 2006).

Finally, a major concern is that many earlier studies use a method of estimation, typically Ordinary Least Squares (OLS), which is unsuitable for categorical censored data such as those typically gleaned from content analysis (Brammer and Pavelin, 2006). In addition OLS fail to control adequately for firm size, industry and other significant determinants of disclosure decisions (Patten, 2002). Therefore, GLS regression is undertaken to further test the research hypotheses and to attest the reliability of the main OLS regression results. Finally, sensitivity analysis using Ordinary Least Squares (OLS) pooled regression with robust standard error is carried out to check the sensitivity and, hence, the robustness of the main regression analysis.

The main objective of the current study is to empirically examine the relationship between corporate governance and each of the quantity and the quality of corporate environmental disclosures in the UK, while controlling for some corporate characteristics as well as an in-depth exploration of quality identification and assessment issues. The major contribution or originality of the current research is its being the first study, to the best of my knowledge, to empirically address corporate environmental disclosure quality assessment in line with the international accounting standards framework. It negates the traditional belief of quantity representation of quality and shifts disclosure quality perspective from volumetric measurement to semantic assessment. Such research investigating issues as environmental disclosure quality identification and assessment that are still relatively unexplored is quite essential. In this respect, the study is expected to fill an existing gap in corporate environmental disclosure literature.

Consequently, it intends to systematically extend prior research within a UK context and to overcome the limitations inherent in prior research. The current study contributes to two streams of literature, the disclosure literature and corporate governance literature, by providing updated documentary and empirical evidence on

the association between corporate governance mechanisms and each of the quantity and quality of environmental disclosure practices in the annual reports of UK companies, while controlling for corporate characteristics. In doing so, it (a) distinguishes between the different categories or areas of activity to which the environmental disclosure relates; (b) incorporates several corporate governance mechanisms as possible explanatory variables for the quantity and quality of corporate environmental disclosure practices of UK companies; (c) develops a broadly defined disclosure quality index in line with the international accounting standards framework that captures the distinct nature of disclosure items and that distinguishes the different types of information content; (d) examines the annual reports of a large and industrially diverse sample, that is, FTSE All-Share Index; (e) conducts both longitudinal and cross-sectional analysis over 2004-2007 inclusive; and (f) employs several types of regression models and statistical analyses, including descriptive statistics; Pearson and Spearman correlations; and OLS, GLS and pooled OLS regressions.

2.8 CONCLUSION

This chapter provides a review of the pertinent prior literature on corporate environmental disclosures and the relationship of the quantity and the quality of such disclosures to corporate governance mechanisms. It commences with an overview of corporate environmental disclosure practices. Based on both prior literature and international standards and guidelines, corporate environmental disclosure is taken to comprise disclosures relating to the company's environmental policies, environmental product and process-related, compliance with environmental laws and standards, environmental auditing, sustainability and other environmentally-related information Environmental disclosure quality is defined in terms of a well-supported framework elaborated by the International Accounting Standards Board (IASB) to reflect on a generally accepted notion of disclosure quality as fits with the purpose of the current study. Current corporate environmental reporting in the UK is essentially a voluntary activity guided by several national and international environmental reporting initiatives and frameworks. These frameworks of standards and guidelines can be

classified under three distinct but complementary categories, including codes of conduct; management standards; and screenings and rankings.

The concept of corporate governance is introduced to encompass both internal aspects of the company, such as internal controls and board structure, and external aspects such as the relationship with shareholders and other stakeholders. The development of corporate governance policy in the UK has undergone fundamental changes since the publication of the Cadbury Report. Although the government has issued some consultation documents and reports, the system of corporate governance in the UK is fundamentally self-regulatory. However, corporate governance has been recently linked to long-term corporate sustainability that concerns various stakeholder groups.

The chapter then explores prior literature on the quantity and quality corporate environmental disclosure and their association with corporate governance mechanisms. Previous studies are divided into the following three streams of studies that are relevant to the present study: prior studies examining the relationship between environmental disclosure quantity and each of corporate characteristics and corporate governance; prior studies examining the relationship between environmental disclosure quality and each of corporate characteristics and corporate governance; and prior studies examining environmental disclosure quality identification and assessment issues.

The chapter concludes with a discussion highlighting possible reasons for the failure of prior research to establish consistent and conclusive results and identifying any gaps in the existing literature. Of particular interest is the assessment of environmental disclosure quality which still remains a rather controversial issue. Calls have been made for a shift in the issue of disclosure quality from volumetric measurement to semantic assessment. The current study would attempt to respond to such calls. Consequently, the present study intends to systematically extend prior research within a UK context and to overcome the limitations inherent in prior research. In doing so, the current study contributes to two streams of literature, the disclosure literature and corporate governance literature, by providing updated documentary and empirical evidence on the association between corporate governance mechanisms and each of the quantity and quality of environmental disclosure practices in the annual reports of UK companies, while controlling for corporate characteristics.

However, proceeding with the current study, following pertinent literature review and the consequent identification of gaps in the existing literature, requires the adoption of a theoretical framework within which an analysis of the relationship in question is undertaken. Such a theoretical framework depicts the conceptual structure for supporting the study's argument and providing the necessary guidance in explaining the relationship between corporate environmental disclosure and corporate governance mechanisms. The next chapter presents the different theories that help explain each of environmental disclosure and corporate governance practices, along with a detailed discussion of the theoretical framework adopted by the present study.

Chapter 3

THEORETICAL FRAMEWORK

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THEORETICAL FRAMEWORK

3.1 INTRODUCTION

Reviewing pertinent prior literature reveals that different theoretical frameworks have been used to explain and analyze each of environmental disclosure practices and corporate governance mechanisms. In addition, literature employs several theories as guidance in explaining the relationship between environmental disclosure and corporate governance. Research on corporate social responsibility - and its association with corporate governance - lacks a dominant paradigm because different researchers have heterogeneous backgrounds and thus are influenced by different values and ideologies (Orlitzky *et al.*, 2011; Parum, 2005). However, it should be noted that a theory will not tell us what to do, but it will tell us what it is possible to do and what is not possible to do. In that way it removes countless things from consideration when we are confronted with the necessity of choosing or acting (Chambers, 1996).

Although there is much variation in the theoretical perspectives being adopted, prior research from a wide spectrum of theoretical backgrounds has acknowledged that good corporate governance is associated with increased transparency and credible disclosure (see Ajinkya *et al.*, 2005; Cormier *et al.*, 2010; Dunstan, 2008; Gul and Leung, 2004). Hence, corporate governance is considered an important mechanism in determining the disclosure required for satisfying the information needs of various stakeholders as it is the board of directors that manages information disclosure in annual reports (Gibbins *et al.*, 1990; Haniffa and Cooke, 2005).

The present study examines the relationship between corporate governance mechanisms and the quantity and quality of corporate environmental disclosure practices in UK companies' annual reports. Corporate environmental responsibility can be seen as strategy adopted by a company to satisfy the environmental expectations of diverse stakeholders. According to the stakeholder theory, environmental reporting helps organizations in communicating the environmental dimensions of their activities, products and services. Environmental disclosure

is therefore regarded as part of the dialogue between the company and its stakeholders (Gray *et al*., 1995a). According to the agency theory, however, disclosure can help mitigate various principal-agent conflicts through sound corporate governance systems.

Based on stakeholder-agency theory, the study's argument can be put forward as follows. Companies are increasingly considering the importance of demonstrating commitment to environmental responsibility, through the provision of complete and qualified environmental disclosure as means of managing their relationships with stakeholders. In this respect, sound systems of corporate governance are serving as accountability mechanisms, by which companies are made responsive to the rights and needs of stakeholders, through reducing information asymmetry. Therefore, it can be argued that the quantity and quality of corporate environmental disclosure directed to various stakeholders are enhanced when managers' opportunistic manipulation is monitored by corporate governance mechanisms.

The reminder of the chapter is devoted to providing a theoretical framework of evidences that support the above argument. In doing so, it reviews the different theories that help explain each of environmental disclosure and corporate governance practices, followed by an analysis and critique of the different theoretical perspectives employed. Next is a detailed discussion of the theoretical framework adopted by the present study to examine the required relationship, justifying the choice of such framework. More specifically, the study would rely on the stakeholder-agency theory that would fit with the nature and scope of the empirical work.

3.2 THEORIES OF CORPORATE ENVIRONMENTAL DISCLOSURE AND CORPORATE GOVERNANCE

Social and environmental disclosure literature has indicated that there is much variation in the theoretical perspectives being adopted (Deegan, 2002), the absence of a single conceptual framework to analyze the required relationships (Belkaoui and Karpik, 1989), the lack of any explicit comprehensive social and environmental responsibility theory underpinning the analysis performed (Roberts, 1992) and the existing probability of insufficiently specified theories (Gray *et al*., 2001). However, three prominent theories have dominated the explanations of social and environmental disclosure practices. These are stakeholder theory,

legitimacy theory and political economy theory. Both legitimacy and stakeholder theories have their roots in the political economy theory (Deegan, 2002). All of these theories are linked to the notion of the existence of a social contract between the organisation and society, whereby a firm is being held responsible and accountable to its entire stakeholders (Gray *et al.*, 1996). Therefore, it has been argued that these theories are overlapping and complementary rather than competing as such (Gray *et al.*, 1995a). In addition, signaling theory has been introduced as a possible explanation of voluntary disclosure practices, of which environmental disclosure is a significant category.

Similarly, corporate governance does not have an accepted theoretical base or a common paradigm (Parum, 2005). Corporate governance has been explained and analyzed using different theoretical frameworks such as agency theory, stakeholder theory, legitimacy theory and stewardship theory. Reviewing corporate governance literature, however, it can be noticed that agency theory and stakeholder theory are the dominant theories. Stakeholder theory has a broader perspective than agency theory as it extends the concept of principal to include all interested parties rather than only shareholders. A further theoretical development embracing an even broader perspective than both theories has been the stakeholder-agency theory, as developed by Hill and Jones (1992). The integration of the stakeholder concept with agency theory has widened the principal-agent paradigm of financial economics.

The main distinction between these theories is in the perspective from which they are viewed and examined. Following is a discussion of each of these theories and how they have been used in the literature. Overview of the different theoretical perspectives will be succeeded by an analysis and critique of these perspectives, justifying the choice of the theoretical framework adopted by the present study to examine the relationship between corporate governance mechanisms and the quantity and quality of corporate environmental disclosure practices in UK companies' annual reports.

3.2.1 Political Economy Theory

Political economy theory has been used in accounting literature as a plausible explanation of corporate social and environmental disclosure practices. The term ‘political economy’ refers to “the social, political and economic framework within which human life takes place” (Gray

et al., 1996: 47). Taking into consideration this broader socio-political perspective that may have an impact on corporate behaviour and on the choice of what information to be disclosed by a company, political economy theory can widen the level of analysis when explaining corporate social and environmental disclosure practices (Deegan and Unerman, 2006).

Political economy theory "suggests that corporate disclosure is a proactive process of information provided from management's perspective, designed to set and shape the agenda of debate and to mediate, suppress, mystify and transform social conflict. This theory recognizes the potential for management to tell its own story or refrain from doing so, according to its own self-interest" (Guthrie and Parker, 1989: 351). The authors extend their discussion of the political economy perspective to include the accounting reports as the perceived media to exercise such disclosure. According to Guthrie and Parker (1990: 166), accounting reports "serve as a tool for constructing, sustaining, and legitimizing economic and political arrangements, institutions, and ideological themes, which contribute to the corporation's private interests. Disclosures have the capacity to transmit social, political, and economic meanings for a pluralistic set of report recipients".

The argument underlying the political economy perspective is that power conflict, inequality of power and the role of government lie at the heart of the structure of society which shapes all that goes on within it (Cooper and Sherer, 1984). The political environment could affect the development of accounting both directly and indirectly. Belkaoui (1983, 1985) argues that the political atmosphere, in general, and political rights and civil liberties, in particular, have significant influence on the development of accounting practices. In addition, the political environment affects accounting in an indirect way through its effect on the national culture and the economy. The form of government influences national culture, which in turn influences the business and accounting environment.

The political economy theory explanations of corporate social and environmental disclosure are concerned with the socio-political economic structure and associated power inequalities with emphasis on the existence of conflict of interests (Adams *et al.*, 1995; Cooper and Sherer, 1984; Tilt, 1994) Under this perspective, corporate management declares their own conceptions and reiterate the surrounding social situation through their control over the reporting process (Adams *et al.*, 1995; Guthrie and Parker, 1989, 1990). Accordingly, a corporation discloses social and environmental aspects that reflect its own beliefs, norms,

values and perceptions, which in turn benefits its self-interest while ignoring other aspects that are of interest to the society (Adams *et al.*, 1995; Guthrie and Parker, 1990).

Based on the above discussion, it can be inferred that management may, therefore, provide voluntary social and environmental information for two purposes. First, management may make disclosures to protect their self-interests in order to foster, sustain and legitimise relationships by portraying an impression of being socially responsible. Second, management may release social or environmental information in order to avoid further regulatory intervention.

Two variants of political economy theory, identified by Gray *et al.* (1996) are 'Classical' political economy and 'Bourgeois' political economy. The Classical Marxian political economy emphasizes the importance of structural conflict, inequality and the role of the government, while the Bourgeois political economy tends to take these things as given, and are thus largely ignored where the world is broadly perceived as pluralistic (Gray *et al.*, 1996). Based on traditional roots of Classical political economy, Bourgeois political economy adopts a wider set of features incorporating ideas from the radical dimension such as notions of social justice and community harmony. Therefore, Gray *et al.* (1996) argue that Classical political economy has little to say concerning corporate social and environmental disclosure practices where much of this practice can be explained with the aid of Bourgeois political economy. Guthrie and Parker (1990) supported this view, arguing that Bourgeois political economy offered a number of valuable insights into explaining corporate social and environmental disclosure practices. Classical political economy theory has been asserted as offering insights by those trying to explain mandatory social disclosure rules, thus indicating the role of the government in handling structural conflict and inequality by imposing restrictions on companies while Bourgeois political economy theory is principally useful in explaining the absence of corporate social and environmental disclosure practice (Gray *et al.*, 1996).

There have been several attempts to explain corporate social and environmental disclosure in light of Bourgeois political economy theory. However, the theory was not consistently supported. Examples of studies supporting the political economy explanations of the disclosure patterns include Guthrie and Parker (1989) and Guthrie and Parker (1990). Similarly, Adams *et al.* (1998) argued that relatively high social disclosure made by UK companies might be a result of attempting to prevent further social regulations by portraying

an impression of being socially responsible and thus, supporting a political economy explanation. In addition, Williams (1999) provide further support to political economy theory by arguing that firms voluntarily provide social and environmental information in response to the pressures of the social, political and economic systems that surround them.

3.2.2 Legitimacy Theory

Legitimacy theory has been widely used in the social and environmental disclosure literature as providing valuable insights into such disclosure practices. Legitimacy is defined by Lindblom (1994: 2) as: "a condition or a status which exists when an entity's value system is congruent with the value system of the larger social system of which the entity is a part. When a disparity, actual or potential, exists between the two value systems, there is a threat to the entity's legitimacy". The argument underlying legitimacy theory is that organisations can only survive if they are operating within the framework of the society's norms and values. To maintain their legitimacy, companies may disclose social and environmental information voluntarily (O'Donovan, 1999) to legitimise their activities, that is, to obtain the society's impression of being socially responsible. Accordingly, corporate social and environmental disclosure aims to legitimise company behaviour by providing information intended to influence the society's perceptions about the company.

Based on legitimacy theory, social and environmental disclosures are a means used by the company to influence the public policy process, either directly by addressing public and/or legislative concerns, or indirectly by projecting company's image as socially aware (Patten, 1992). According to Guthrie and Parker (1989), legitimacy theory argues that the corporate disclosures are made as reactions to environmental pressures (economical, social, and political) and to legitimate the company's existence and actions. Hence, legitimacy theory suggests that the corporate environmental reporting is a function of the level of political and social pressure with which companies face concerning their environmental performance (Cho and Patten, 2007). In response to these pressures, firms react by disclosing more environmental information in order to preserve their image of being a legitimate company and to avoid the negative consequences caused by legitimacy crises (De Villiers and Van Staden, 2006).

Therefore, legitimacy theory emphasizes the importance of societal acceptance in ensuring a company's existence and survival (Ghazali, 2007). The author argues that an underlying assumption of legitimacy theory is the belief that a company's actions can have an impact on the surrounding environment in which it operates, and in case a company's activities are perceived to have detrimental or negative effects on the environment, the society may adversely react by boycotting the company's product or pressuring for government intervention. In this instance, firms legitimate their activities through various means, including communication with relevant stakeholders (Ashforth and Gibbs, 1990). Corporate social and environmental disclosure, in particular, is provided as a means to justify the company's continued existence (Ghazali, 2007). This view of legitimacy has been recently extended to include what is called 'environmental legitimacy', defined as "the generalized perception or assumption that a firm's corporate environmental performance is desirable, proper, or appropriate" (Bansal and Clelland, 2004: 94). Environmental legitimacy may influence how a firm chooses to express its environmental commitment and, hence, management's decisions regarding environmental disclosure (Aerts and Cormier, 2009; Rupley *et al.*, 2011).

The notion behind legitimacy theory relates to the concept of 'social contract' (Patten, 1992). The existence of an organisation is threatened if it is regarded as violating the implied social contract. This is usually believed to take place whenever the society members are not satisfied with the behaviour of the concerned company (Milne and Patten, 2002). Failure to comply with society expectations leads to revocation of the contract (Deegan and Rankin, 1996). Alternatively, a pressure group might empower better performance from the firm through putting pressure on it to meet expectations through legislation (Buhr, 1998). Therefore, Legitimacy theory forms a sort of stress on the corporations to react to the society's expectations (Guthrie and Parker, 1989). These society's expectations are satisfied by additional disclosure of social and environmental information (Wilmshurst and Frost, 2000).

Lindblom (1994) argues that an organisation may employ four legitimating strategies when faced with different legitimating threats. Thus, the organisation may:

1. Seek to educate and inform its stakeholders about changes in the organisation's performance;

2. Seek to change stakeholders' perceptions about the organisation's performance without changing the performance itself;

3. Manipulate perception by deflecting attention from the issues of concern to other related but appealing issues;

4. Seek to change external expectations about its performance.

It can be noticed that disclosure can play an important role in each of these four strategies. As long as legitimising activities are an effort to change negative perceptions, it is argued that any effective corrective action has to be accompanied by public disclosure (Cormier and Gordon, 2001; Deegan *et al.*, 2000). Choice of an appropriate strategy is based on perceptions of society expectations, or terms of the social contract and how the society perceives the company is acting or responding (Deegan *et al.*, 2002). Moreover, O'Donovan (2002) argues that the choice of the strategy, and disclosure reaction, largely depends on whether the intention of the action is to gain, maintain, or repair its legitimacy within the society.

Numerous studies have employed legitimacy theory in social and environmental disclosure literature. A great deal of which have consistently supported the explanatory power of legitimacy theory (e.g. Deegan and Gordon, 1996; Deegan and Rankin, 1996; Gray *et al.*, 1995a; Patten, 1992). These studies found that a strong driving force of disclosure practices is the desire to legitimise organisational activities and to enhance corporate image (Clarke and Gibson-Sweet, 1999; Deegan and Rankin, 1996). Moreover, the increasing concern about society increased the level of social responsibility information in annual reports, which is believed to be legitimacy evidence supporting corporate reaction to society to gain its approval for the company's existence and growth (Deegan and Rankin, 1996; Patten, 1992).

However, some studies failed to provide evidence that support legitimacy theory but rather might question the theory's ability to provide explanations as to corporate social and environmental disclosure practices (e.g. Campbell *et al.*, 2003; Guthrie and Parker, 1989; O'Dwyer, 2002). Previous research concluded that legitimacy theory was inadequate to fully explain corporate social reporting indicating that "a relationship between legitimacy theory and disclosure was only marginally supported for environmental issues, unconfirmed for energy and community issues and subject to contradictory evidence for human resources issues" (Guthrie and Parker, 1989, p.351). In addition, Wilmshurst and Frost (2000) contend

that prior research has not provided consistent support for legitimacy theory and concluded that legitimacy theory provides limited explanation for the decision to disclose environmental information. Furthermore, Campbell *et al.* (2003) found that legitimacy theory has not provided an appropriate measure of the effect of disclosure changes in the perception of the relevant publics in isolation from other influences and events in the society.

3.2.3 Stakeholder Theory

Stakeholder theory has been widely employed in accounting literature as providing strong justification for both corporate social and environmental disclosure practices and corporate governance mechanisms. Stakeholder theory involves the recognition and identification of the relationship between the company's behavior and the impact on its stakeholders (Ansoff, 1965). Therefore, "the corporation's continued existence requires the support of the stakeholders and their approval must be sought and the activities of the corporation adjusted to gain that approval. The more powerful the stakeholders the more the company must adapt" (Gray, *et al.*, 1995a: 53). According to Gray *et al.* (1996), the organization has many stakeholders, hence, it owes accountability to all its stakeholders, referring to the wide range of responsibilities assigned to corporate decision-makers. In addition, the more important the stakeholder to the organization, the more effort will be made to manage and manipulate this relationship. Managing such relationship can be done by providing more information through voluntary social and environmental disclosures, to gain the support and approval of these stakeholders.

The historical context of the current stakeholder theory was formed through three major developments in the intellectual, political and economic life of the 1970s and 1980s (Hendry, 2001). One of these was the introduction of a new economic theory of the firm, in which the firm was defined as a nexus of contracts, of which the principal-agent contract between shareholders and managers is a primary one. The interpretation of the principal-agent relationship, which is sometimes referred to as "stockholder theory", was reinforced by the second key development of the period, the rise of the free-market private-property economic policies characteristic of the 1970s and 1980s. Earlier debates existed about the legitimate role of management, challenging the concept of the social responsibility of business by arguing that the moral responsibility of managers was to serve the interests of shareholders,

which generally will be to make as much as money as possible. The third key development of the period was the rapid growth of capital markets and takeover activity. This led to both legal and political engagement between managers and shareholders. The managers, who were rewarded on the basis of short-term stock market returns, were ready to embrace the new principal-agent concept and declare allegiance to their shareholders' objectives (Hendry, 2001).

Stakeholder theory first appeared, in the context of these developments, as a defense of the social responsibilities of the business and as a declaration that managers must have moral responsibilities to other interested parties, not just to its shareholders (Hendry, 2001). These interested parties are the stakeholders who have an interest or a stake in the corporation and who are a critical factor in determining the corporation's success or failure. Based on stakeholder theory, a variety of stakeholders are involved in the organization and each of them deserves some return for their involvement (Crowther and Jatana, 2005). Freeman (1984) had done a great effort in laying the foundation or groundwork for the development of the stakeholder theory in the early 1980s.

Stakeholder theory begins with the assumption that values are a necessary part of doing business and rejects the separation of ethics and economics (Freeman, 1994). According to Freeman *et al.* (2004), stakeholder theory "asks managers to articulate the shared sense of the value they create and what brings its core stakeholders together. It also pushes managers to be clear about how they want to do business, specifically what kinds of relationships they want and need to create with their stakeholders to deliver on their purpose". An organisation's activity is embedded in a network of stakeholder relationships (Darnall *et al.*, 2010). Stakeholder theory development has centered around two related streams: (1) defining stakeholder concept, and (2) classifying stakeholders into categories that provide an understanding of individual stakeholder relationships (Rowley, 1997).

Several attempts have been made as to stakeholders' definition. Freeman (1984: 25) defines a stakeholder as "any group or individual who can affect or is affected by the achievement of the firm's objectives". Hill and Jones (1992: 133) define stakeholders as "constituents who have a legitimate claim on the firm". This legitimacy is established through the existence of an exchange relationship. Gray *et al.* (1996: 33) define a stakeholder as "any human agency that can be influenced by, or can itself influence, the activities of the organization in question". These definitions provide the core boundaries of what constitutes a stake. An

organization is, therefore, likely to have many stakeholders such as shareholders, customers, suppliers, employees, creditors, competitors, public interest groups, local communities, governmental bodies, stock markets, industry bodies, national and international society and the general public. Each of the stakeholders can be seen as supplying the firm with critical resources and in exchange each expects its interests to be satisfied (Hill and Jones, 1992).

Stakeholders' classification can take various forms. For example, internal or external; primary or secondary; owners or non owners of the firm; owners of the capital or owners of less tangible assets; actors or those acted upon; those existing in a voluntary or an involuntary relationship with the firm; and resource providers to or dependents of the firm. Different stakeholders influence organizations in different ways; some stakeholders have more influence over organizations than others. This depends on: (1) the structural nature of the organization/stakeholder relationship; (2) the contractual forms existing; and (3) the institutional support available (Friedman and Miles, 2002). A useful differentiation, however, has been made between primary and secondary stakeholders (Freeman, 1984; Mitchell *et al*., 1997).

A primary stakeholder group is one without whose continuing participation the corporation can not survive as a going concern. Primary stakeholders have a direct economic stake in the organization (Donaldson and Preston, 1995). Accordingly, primary stakeholders include those who are directly related to an organization and have the ability to impact its bottom line directly such as shareholders, creditors, managers and employees, customers, suppliers, regulatory stakeholders and community stakeholders. Shareholders provide the firm with capital and in exchange, they expect receiving a satisfactory risk-adjusted return on their investments and realizing appreciation in stock market value over time. Creditors provide the firm with finance and in exchange expect their loans to be repaid on schedule. Managers and employees provide the firm with time, skills, and human capital commitments. In exchange, they expect fair income and adequate working conditions. Customers supply the firm with revenues and expect value for money in exchange. Suppliers provide the firm with inputs and seek fair prices and dependable buyers in exchange. Regulatory stakeholders, mainly governmental bodies, are interested in influencing business by exerting political, legal, social, and governmental pressures on companies to act in an environmentally responsible behaviour. Community stakeholders include local community groups, environmental organizations and other political lobbies. Local communities provide the firm with locations,

a local infrastructure, and perhaps favorable tax treatment, and in exchange, they expect corporate citizens who enhance and/or do not damage the quality of environment (Clarkson; 1995; Donaldson and Preston, 1995; Freeman, 1984; Henriques and Sadorsky, 2008; Hill and Jones, 1992; Mitchell *et al*., 1997; Waddock and Graves, 1997).

Secondary stakeholders are those who influence or affect, or are influenced or affected by the corporation, but they are not engaged in transactions with the corporation and are not essential for its survival. Secondary stakeholders are not directly involved in the firm's economic transactions (Mitchell *et al.*, 1997). Secondary stakeholders can benefit or damage a firm through their influence on primary stakeholders. Accordingly, secondary stakeholders include the general public and media. The general public, as taxpayers, provides the firm with a national infrastructure, and in exchange, they expect corporate citizens, who enhance and/or damage the quality of environment and do not violate the rules of the game established by the public through their legislative agents. The media, through mass communication technology, can influence society's perception of a company. Hence, it can mobilize public opinion in favor of or against a corporation's environmental performance (Clarkson; 1995; Donaldson and Preston, 1995; Freeman, 1984; Henriques and Sadorsky, 2008; Hill and Jones, 1992; Mitchell *et al*., 1997; Waddock and Graves, 1997).

The main advantage of stakeholder theory is providing a means of dealing with multiple stakeholders with multiple conflicting interests. It has been argued that the satisfaction of interests of the different stakeholders is achieved using system centered theory (Freeman, 1984). Stakeholder theory offered a new perspective in the context of corporate social responsibility research by suggesting that the needs of shareholders cannot be met without satisfying the needs of other stakeholders (Foster and Jonker, 2005; Jamali, 2008). Hence, stakeholder theory provides a useful framework to evaluate corporate social and environmental reporting activities (Snider *et al*., 2003). Stakeholder theory has two different categories (Gray *et al*., 1996; Deegan, 2000). The first category relates to the ethical or normative branch (which is prescriptive) and the second category relates to the managerial branch (which is descriptive).

The ethical or normative perspective of stakeholder theory argues that all stakeholders have certain minimum rights that must not be violated and should be met regardless of the power of the stakeholders involved. Accordingly, and in conformity with the concept of social contract, all stakeholders have a right to be provided with information about the

organization's impact on them, regardless of whether or not such information would be utilized (Deegan, 2000). Taking into account the notion of rights to information, Gray *et al.* (1996: 38) define accountability as "the duty to provide an account (by no means necessarily a financial account) or reckoning of those actions for which one is held responsible". They argue that such accountability involves two responsibilities or duties: (a) the responsibility to undertake certain actions; and (b) the responsibility to provide an account of those actions.

The accountability model developed by Gray *et al.* (1996) hypothesizes a two-way relationship between the management of an organization and stakeholders. Applying the accountability model necessitates the existence of a reporting system of the organisation's activities. Hence, the need for additional information to voluntarily disclose social and environmental performance to inform stakeholders about the extent to which managers' responsibility have been fulfilled (Gray *et al.*, 1991) as is implied by the corporate governance principal of disclosure and transparency. Under the accountability model, the argument is that the principal can choose to ignore the information provided by the agent, who nevertheless, is still required to provide an account (Gray *et al.*, 1991) to fulfill the principles of best practice of corporate governance.

The normative stakeholder theory can be further distinguished into three different kinds (Hendry, 2001). The first kind maintains that in a just society a business should be managed in the interests of all stakeholders not only shareholders. Any consideration of the actual state of the laws and institutions is relevant only to the extent that these laws and institutions conform to the ethical ideals of a just society. Normative stakeholder theory of the second kind maintains that the laws and institutions of society should be modified to reflect the greater managerial responsibility toward stakeholders. The second kind may appear as a corollary to the first kind, in that structuring an ideal society settings permits comparison with existing realities and suggesting modifications. The third kind of normative stakeholder theory maintains that managers should not only take the interests of all stakeholders into account, but also consult those stakeholders and allow their participation in the decision making processes of the firm (Hendry, 2001).

The second category of stakeholder theory relates to the managerial branch. Unlike the normative ethical branch of stakeholder theory, the managerial perspective of stakeholder theory argues that organizations will tend to satisfy the information demands of those stakeholders who are important to the organization's ongoing survival. Some stakeholders

have more influence over the organization than others (Friedman and Miles, 2002). Whether a particular stakeholder receives information will be dependent upon how powerful that stakeholder is perceived to be (Deegan, 2000). Mitchell *et al.* (1997) argued that stakeholder identification and salience is a function of stakeholders' possessing one or more relationship attributes: power, legitimacy and urgency.

A stakeholder's power to influence corporate management is viewed as a function of the stakeholder's degree of control over resources required by the organization (Ullmann, 1985). Power, in this sense, means the ability to use resources to make an event happen or to secure a desired outcome. For example, UK Corporate Governance Code (2010) of corporate governance gives shareholders the legitimate right to cast a vote, thereby influencing company policy and hence protecting their investment. Another important notion of power in the corporate environmental responsibility literature is the political power by which governments - or other stakeholders using their resources to pressure government - create legislation, make regulations, or bring lawsuits against corporations or by which to adopt new laws or regulations or to take legal action against a company. A stakeholder group achieves legitimacy if it has a legitimate standing in a society or legitimate claims on the firm. The urgency attribute incorporates both the notion of time sensitivity - the pressing need on the part of the stakeholder that its concerns/claims be given immediate attention and the notion of criticality - the belief on the part of the stakeholder that its claims are critical and highly important (Mitchell *et al.*, 1997).

According to Ullmann (1985), the more critical the stakeholder resources are to the continued viability and success of the organization, the more powerful the stakeholders and the greater the probability that the stakeholder demands will be incorporated within the organization's operations. Some of these demands may relate to the provision of environmental information that is directly related to the expectations of particular stakeholder groups. Donaldson and Preston (1995: 67) also argued that the stakeholder theory is managerial in that "it does not simply describe existing situations or predict cause-effect relationships; it also recommends attitudes, structures and practices that, taken together, constitute stakeholder management. Stakeholder management requires, as its key attribute, simultaneous attention to the legitimate interests of all appropriate stakeholders, both in the establishment of organizational structures and general policies and in case-by-case decision making". However, managerial

stakeholder theory does not imply that all stakeholders should be equally involved in the decision-making process.

Based on the above discussion, it is worth mentioning that normative approach of stakeholder theory, which relates to the accountability cannot be powerful in providing explanations for corporate social and environmental disclosure undertaken by organisations (Gray *et al*., 1996) and thus, cannot provide prediction as to managerial behaviour in terms of practices (Deegan, 2002). Under the managerial approach of stakeholder theory, however, corporate social and environmental disclosure can be seen as part of the dialogue between the organization and its stakeholders (Gray *et al*., 1995a). Hence, such disclosure is regarded as a means by which stakeholders are managed to gain support and approval for the organization's continued existence (Gray *et al*., 1995a) as well as to distract stakeholders' opposition and disapproval (Gray *et al*., 1996) rather than to discharge accountability (Deegan, 2002). Nevertheless, since accountability in this model is based on management's self-perceptions of the significance of particular stakeholders, the information needs of important but less powerful individuals and groups may be overlooked. Therefore, stakeholder theory can help with providing indicative interpretation as to which stakeholder groups are considered by the organisation to be more powerful and important and, accordingly, the organisation would seek to influence through disclosure practices (Gray *et al*., 1996).

The stakeholder theory has been presented and used in three different and distinct ways as to methodologies, types of evidence, and criteria of appraisal. Donaldson and Preston (1995: 65) argued that stakeholder theory has been advanced and justified in the literature explicitly or implicitly "on the basis of its descriptive accuracy, instrumental power, and normative validity". The descriptive or empirical approach is used to describe and/or explain specific corporate characteristics and behaviors. For example, it has been used to describe the nature of the firm, the way managers think about managing, how board members think about the interests of corporate constituents, and how corporations are actually managed. The instrumental approach is used to identify the connections, or lack of connections, between stakeholder management and the achievement of traditional corporate objectives. This theory has been widely used in studies of corporate social responsibility, suggesting that adherence to stakeholder principles and practices achieves conventional corporate performance objectives. The normative approach is used to interpret the function of the corporation, including the identification of moral or philosophical guidelines for the operation and

management of corporations. Normative concerns dominated the classic stakeholder theory and continued to dominate in its most recent versions (Donaldson and Preston, 1995).

Descriptive stakeholder theory proposes stakeholder answers to questions of fact; instrumental stakeholder theory proposes stakeholder-oriented answers as to how managers meet specific objectives, which may or may not have ethical elements; and the normative stakeholder theory draws on ethical percepts to propose stakeholder-oriented answers to questions of corporate governance (Hendry, 2001). Briefly stated, the three theories address the questions of what happens? What happens if? And what should happen? respectively (Jones, 1995). In other words, "Proponents of stakeholder theory strive to describe what managers actually do with respect to stakeholder relationships, what would happen if managers adhered to stakeholder management principles, and what managers should do vis-a-vis dealing with firm stakeholders" (Jones, 1995: 406).

Donaldson and Preston (1995) argued that the underlying epistemological issue in the literature is the problem of justification: Why should the stakeholder theory be accepted or preferred over alternative theories? The answer to this question is related to the distinct purpose that the theory is intended to serve. Descriptive justifications attempt to show that the concepts underlying the theory correspond to observed reality, instrumental justifications attempt to show evidence of the connection between stakeholder management and corporate performance, while normative justifications attempt to explain underlying concepts such as individual or group rights, social contract, or and corporate social responsibility (Donaldson and Preston, 1995). They concluded that normative aspects underpin stakeholder theory in all of its three forms.

Regarding the explanation of corporate social and environmental disclosure practices, it can be concluded, that stakeholder theory explains the observable relationships in the real world based on its descriptive aspect (Donaldson and Preston, 1995). Using the managerial branch of the stakeholder theory, corporate social and environmental disclosure is regarded as a means by which stakeholders are managed to gain support and approval for the organization's continued existence (Gray *et al.*, 1995a) as well as to distract stakeholders' opposition and disapproval (Gray *et al.*, 1996). Stakeholder theory recognizes that there are a broad range of stakeholders who are interested in the environmental behaviour of companies and, consequently, demand information regarding the impact of their activities on the environment (Moneva and Llena, 2000). To the extent that firms recognize the rights of their stakeholders'

interests, they tend to voluntarily report more environmental information in order to meet their requests (Monteiro and Aibar-Guzmán, 2010).

Various stakeholders are demanding more disclosure of corporate environmental information due to their interest in the environmental issues and its related costs and liabilities (Mastrandonas and Strife, 1992). In respond to this demand, many corporations are issuing voluntary separate environmental reports apart from the traditional annual financial reports. Moreover, environmental issues are taken into consideration of stakeholders' risk and return (Neu *et al.*, 1998). Furthermore, stakeholders are increasingly demanding that environmental disclosure truly and fairly represents companies' past and future achievements (Gray, 2000). Therefore, developing stakeholder theory provides structure for the environmental issues of the relationship between stakeholders and business corporations (Joseph, 2007).

3.2.4 Signaling Theory

Signaling theory has been employed as a possible explanation of voluntary disclosure practices, of which environmental disclosure is a significant category. The concept of signaling was first introduced in 1973 by Spence, based on the seminal work of Akerlof in 1970. Signaling is a reaction to information asymmetry where managers have more information than stakeholders have. Signaling theory shows how information asymmetry can be reduced when the party with more information signals it to others (Morris, 1987). Signaling theory recognizes the separation of ownership and management and holds that market pressures motivate managers to disclose information. Managers, having more information about the company than other stakeholders, may send signals to interested parties so as to distinguish themselves from other companies. Hence, voluntary disclosure can be regarded as a means of signaling such information.

Signaling theory predicts that healthy firms are likely to disclose more information than distressed firms (Ross, 1979). However, when information is costless, managers will disclose both good and bad information, as stakeholders would put the worst interpretation on non disclosure (Grossman, 1981). Furthermore, managers voluntarily disclose both good and bad news, as the good news signals quality and bad news is signaled to reduce the reputation costs incurred for non disclosure in the relevant time and, therefore, to prevent a decline in

the firm's share price (Skinner, 1994). Even companies with no information may have incentives to continue with disclosing in order to distinguish themselves from companies with bad news. Hence, it can be argued that the extent and quality of the signaled information play an important role as the firm faces a trade-off between reducing the value of its informational advantage and raising financing at better terms.

Nevertheless, managers may choose to follow a non disclosure policy. Non disclosure, especially in a highly competitive environment, aims to protect the company from adverse effects of hiding or mitigating the severity of bad news (Ockabol and Tinker, 1993). Moreover, Dye (1985) indicated that even a company with good news may choose to withhold information. On the other hand a company with bad news may choose to disclose this news if the company is worried about the competitors' reaction to this information. Possible reasons for non disclosure may be that managers do not have information to disclose (Penno, 1997) or uncertainty about the effect of disclosure on the manager's performance (Nagar, 1999).

However, in order to signal successfully, managers should use credible signals (Eccles *et al.*, 2001). Otherwise, the firm would be penalized if it provides misleading information (Hughes, 1986). An attempt to falsely signal quality results in no subsequent disclosures being seen as credible. Farrel and Gibbons (1989), examined how signaling is affected by the presence of different stakeholders, such as investors and competitors. They argued that when a company is more concerned with its relationship with investors than potential competitors, it will signal truthfully. On the other hand, if the company is more concerned about preventing market entrance, it will adopt a strategy of non verifiable claims, whereby signals will not be credible. In a similar vein, Newman and Sansig (1993) draw attention to the difficulty of the signaling process when many parties or multiple users are involved.

Signaling theory has been used in many studies to explain disclosure decisions by managers. However, the theory has been criticized in many respects. The main criticism is made as to the assumption of signaling theory that managers are acting in their own interest. Furthermore, a number of authors criticize the assumption of equal distribution of power. They argue that it is not individuals who exercise power but institutions (Gray *et al.*, 1996). Finally, an attention is drawn as to the empirical difficulty of the signaling process when many parties or multiple users are involved (Newman and Sansig, 1993).

3.2.5 Agency Theory

Agency theory has been dominantly used in accounting literature to explain and analyze corporate governance practices. Agency theory was introduced during the 1970s as a new economic theory of the firm, in which the firm was defined as a nexus of contracts, of which the principal-agent contract between shareholders and managers is a primary one. Agency theorists such as Jensen and Meckling (1976) sought to determine the form of contracts that would maximize shareholder utility. The new economics was quickly absorbed into the practice of corporate governance, as being dominated by a concern with the agency relationship between shareholders and managers and with the regulations and contractual terms through which conflicts arising from such relationship might be addressed (Hendry, 2001; Jensen and Murphy, 1990).

An agency relationship is defined as one in which one or more persons (the principal) engage another person (the agent) to perform some service on their behalf which involves delegating some decision-making authority to the agent (Jensen and Meckling, 1976; Ross, 1973). A key assumption of agency theory is that the interests of principals and agents diverge. Two problems exist in agency relationships. First, the agent and the principal have conflicting goals. Second, the principal and the agent have different propensities to accept risk (Jones, 1995). In addition, the author suggested two reasons for agent failure to adequately pursue the interests of the principal; moral hazard and adverse selection. 'Moral hazard' exists due to a lack of effort on the part of the agent. 'Adverse selection' exists when the agent does not behave in the manner preferred by the principal (see also Heath and Norman, 2004).

According to agency theory, the separation of ownership and management results in agency costs which are categorized as: (a) monitoring costs, incurred by principal to reduce agent actions that are not in the principal's interests; (b) bonding costs, incurred by the agent to guarantee that the agent does not undertake actions that are not in the principal's interests; and (c) residual loss, incurred because monitoring and bonding may not fully align agent behavior and principal interests (Jensen and Meckling, 1976). Agency theory is based on assumptions regarding information asymmetry, opportunism, and possible conflict of interests (Halme and Huse, 1997). Thus, there is a need to control or monitor managers to ensure that their efforts maximize shareholders' wealth. Agency costs are incurred in order to reduce or eliminate the effects of agency conflicts, which exist when managers or agents undertake opportunistic actions to maximize their own interests.

Agency theory is the most recognized and prominent perspective that has guided research on corporate boards (Zahra and Pearce II, 1989). Within the framework of corporate governance mechanisms, agency theory suggests that managers are more likely than stockholders to emphasize corporate social and environmental concerns because they have no residual claim on a firm's income (Graves and Waddock, 1994). In other words, agents might show devoted concern for the environment because they are not spending their own money (Halme and Huse, 1997). Furthermore, agents are more likely than principles to pursue non-profit goals, e.g. environmental protection, in order to secure their positions (Wang and Coffey, 1992). Therefore, environmental disclosures can be function of corporate governance in the sense that managers who have better access to a firm's information than shareholders can make credible disclosure to enhance firm value by reducing agency costs, as disclosure is one of monitoring devices used to reduce such costs (Craswell and Taylor 1992).

3.2.6 Stakeholder-Agency Theory

Stakeholder-agency theory, a further theoretical development embracing a broader perspective than agency theory and stakeholder theory, has been developed by Hill and Jones (1992). The integration of the stakeholder concept with agency theory has widened the principal-agent paradigm of financial economics to develop stakeholder-agency theory which is considered to be a generalized theory of agency. Stakeholder-agency theory attempts to explain the nature of the implicit and explicit contractual relationships that exist between a firm's stakeholders. Specifically, this paradigm "helps explain the following: (1) certain aspects of a firm's strategic behaviour; (2) the structure of management-stakeholder contracts; (3) the form taken by the institutional structures that monitor and enforce contracts between managers and other stakeholders; and (4) the evolutionary process that shapes both management-stakeholder contracts and the institutional structures that police those contracts" (Hill and Jones, 1992: 131).

Under stakeholder-agency theory, the firm is viewed as a nexus of contracts between resource holders or stakeholders. Stakeholder-agency theory encompasses the implicit and explicit contractual relationships between all stakeholders. Therefore, the theory expands agency relationship to include other stakeholders. Accordingly, managers can be seen as the agents of all other stakeholders. Stakeholders differ among themselves with respect to their stake in

the firm, to their importance, and to their power towards the managers. This distinction is important because stakeholders with a high stake will demand more comprehensive incentive mechanisms and governance structures in order to safeguard their investments in the firm.

Hill and Jones (1992) indicate that this approach can be viewed as a modification of agency theory, which assumes efficient markets and rejects the idea of power differentials between managers and stakeholders. However, stakeholder theory admits the existence of market inefficiencies and accommodates theories of power or resource dependency theory that implicitly assumes inefficient markets which recognize the existence of unequal resource dependencies (power differentials) between managers and stakeholders. Some of the strategies pursued by managers with respect to stakeholders are regarded as an attempt to make use of these power differentials. As a result, new incentive structures and institutional mechanisms evolve to monitor and enforce the terms of implicit contracts between managers and stakeholders. These incentive structures and institutional mechanisms reduce transaction costs to the point where further reductions in such costs are balanced by the costs of developing more complex institutional structures to reduce them (Friedman and Miles, 2002).

Moreover, integration of agency theory with stakeholder theory gives attention to the special role of managers towards all stakeholders. The information asymmetry between managers and other stakeholders expands the management's role to include a duty of safeguarding the welfare of the corporation and of balancing the conflicting claims of multiple stakeholders to achieve this goal. This can be secured through a number of institutional structures or governance mechanisms (such as the board directors, the market for corporate control and the legal superstructure of society) that have emerged for the monitoring and enforcing the terms of implicit contracts (Hill and Jones, 1992).

On the one hand, monitoring mechanisms overcome the problem of information asymmetry that exists between managers and stakeholders. Managers are in a position to conceal or distort the information released or disclosed to stakeholders. Stakeholders, in turn, use their own monitoring mechanisms to gather and analyze additional information, the costs of which may be prohibitive. However, monitoring mechanisms achieve economies of scale in information gathering and analysis, primarily through the employment of specialists, the consequence of which is a reduction in utility loss. Monitoring mechanisms include: (a) legislative structures requiring annual disclosures; (b) information-selling organizations such

as stock analysts' services and consumer reports; (c) non-profit monitoring organizations such as labor unions (Hill and Jones, 1992).

On the other hand, enforcement mechanisms are employed by stakeholders prior to any resource exchange in an attempt to prevent management from benefiting at the expense of stakeholders. The effectiveness of such devices depends on their credibility (Schelling, 1960), so that the benefits of reducing the utility loss from management opportunism outweigh the costs involved in putting these mechanisms into effect. Enforcement mechanisms include: (a) law, imposing legal penalties, such as laws against insider trading, antitrust regulations and pollution regulations; (b) exit, from the exchange relationship, involving a threat to withdraw resources from the firm if management fails to serve stakeholder interests; and (c) voice, as articulated by labor unions, consumer unions, and special-interest groups having a legitimate claim to represent shareholder interests, where publicity can severely damage managerial reputation (Hill and Jones, 1992; Hirschman, 1970; Pfeffer and Salancik, 1978).

Finally, Hill and Jones (1992) contend that, unlike earlier theories, the stakeholder-agency paradigm explicitly focuses on the causes of conflict between managers and stakeholders. In addition, stakeholder-agency theory embraces and highlights the concepts underlying the adjustment mechanisms that realign management and stakeholder interests in case of conflict of such interests. Managing these conflicts necessitates the use of voluntary disclosure, particularly environmental disclosure, by managers to communicate with stakeholders and to acquire their support (Watson *et al.*, 2002). Different stakeholders have different priorities and need different information. Moreover, their ability to get information is different. Therefore, effective use of disclosure policy, in terms of both quantity and quality, may help in building trust with the shareholders and other stakeholders. Hence, stakeholder-agency theory may provide some useful insights to the current research.

3.2.7 Discussion, Analysis, And Critique

Different theoretical frameworks have been used in the accounting literature to explain and analyze each of environmental disclosure practices and corporate governance mechanisms. Three prominent theories have dominated the explanations of social and environmental disclosure practices. These are stakeholder theory, legitimacy theory and political economy

theory. In addition, signaling theory has been introduced as a possible explanation of voluntary disclosure practices, of which environmental disclosure is a significant category. Reviewing corporate governance literature, however, it can be noticed that agency theory and stakeholder theory are the dominant theories. The main distinction between these theories is in the perspective from which they are viewed and examined.

All of the three socio-political theories of corporate social disclosure are linked to the notion of the existence of a social contract between the organisation and society, whereby a firm is being held responsible and accountable to its entire stakeholders (Gray *et al.*, 1996). They suggest that the extent of social and environmental disclosure is dependent on the exposure to public pressure in the social and/or political environment in the form of social or regulatory changes (Patten, 2002), Therefore, it has been argued that these theories are overlapping and complementary rather than competing as such (Gray *et al.*, 1995a). These theories, however, "are not as yet fully fledged theories ... but provide useful frameworks within which to study the developing practice of CSR" (Gray *et al.*, 1996: 49). Accordingly, there has been a tendency by some researchers to rely upon more than one theory in providing an explanation for managerial behaviour (Fiedler and Deegan, 2002).

Political economy theory shares much with stakeholder theory and legitimacy theory. Both legitimacy and stakeholder theories have their roots in the political economy theory (Deegan, 2002). In much of the applications, legitimacy theory and stakeholder theory tend to reflect a bourgeois political economy (Gray *et al.*, 1995a; Gray *et al.*, 1996). The differences between legitimacy theory and political economy theory lie in how the means and motivations are viewed, with both theories giving perspectives as to the means to organisational legitimacy (Buhr, 1998). Legitimacy theory borrows some insights from stakeholder theory. This mainly relates to identifying the relevant stakeholders. While legitimacy theory focuses on the whole society, the focus of stakeholder theory is rather directed towards particular groups which are deemed to be more powerful in influencing the future of the company (Deegan, 2002).

However, attempts to explain corporate social and environmental disclosure in light of Bourgeois political economy theory revealed that the theory was not consistently supported. The political economy theory explanations of corporate social and environmental disclosure are concerned with the socio-political economic structure and associated power inequalities with emphasis on the existence of conflict of interests (Adams *et al.*, 1995; Cooper and Sherer, 1984; Tilt, 1994) Under this perspective, corporate management declares their own

conceptions and reiterate the surrounding social situation through their control over the reporting process (Adams *et al.*, 1995; Guthrie and Parker, 1989, 1990). Accordingly, a corporation discloses social and environmental aspects that reflect its own beliefs, norms, values and perceptions, which in turn benefits its self-interest while ignoring other aspects that are of interest to the society (Adams *et al.*, 1995; Guthrie and Parker, 1990).

Similarly, prior literature has questioned the explanatory power of legitimacy theory (O'Dwyer, 2002) and has suggested that there is a need for integrating legitimacy theory with other dimensions to provide a complementary understanding of the contents of social and environmental disclosures (Bebbington *et al.*, 2008). Previous research concluded that legitimacy theory was inadequate to fully explain corporate social reporting indicating that "a relationship between legitimacy theory and disclosure was only marginally supported for environmental issues, unconfirmed for energy and community issues and subject to contradictory evidence for human resources issues" (Guthrie and Parker, 1989: 351). In addition, Wilmshurst and Frost (2000) contend that prior research has not provided consistent support for legitimacy theory and concluded that legitimacy theory provides limited explanation for the decision to disclose environmental information. It is observed that firms refer to legitimacy theory through voluntary disclosures as a fear from violating the social contract (Joseph, 2007).

Furthermore, legitimacy theory focuses on society and compliance with societal expectations as embedded in the social contract. However, society is clearly made up of various groups having unequal power or ability to influence organisations and other groups. Given that legitimacy theory is dealing with perceptions, the theory has not provided an appropriate measure of the effect of disclosure changes in the perception of the relevant publics in isolation from other influences and events in the society (Campbell *et al.*, 2003). Therefore the theory has not provided an attention to the conflict of interests of the different stakeholders, assuming that environmental disclosure is likely to sufficient in terms of quantity and quality, which is questionable as it might not actually be the case.

Stakeholder theory, however, explicitly acknowledges this fact. The insights provided by stakeholder theory can help in identifying which groups might be relevant to particular management decisions. Therefore, stakeholder theory can help with providing indicative interpretation as to which stakeholder groups are considered by the organisation to be more powerful and important and, accordingly, the organisation would seek to influence through

disclosure practices (Gray *et al.*, 1996). The stakeholder theory's main advantage is providing a means of dealing with multiple stakeholders with multiple conflicting interests. Stakeholder theory offered a new perspective in the context of corporate social responsibility research by suggesting that the needs of shareholders cannot be met without satisfying the needs of other stakeholders (Foster and Jonker, 2005; Jamali, 2008). Hence, stakeholder theory provides a useful framework to evaluate corporate social and environmental reporting activities (Snider *et al.*, 2003).

Regarding the explanation of corporate social and environmental disclosure practices, it can be concluded, that stakeholder theory explains the observable relationships in the real world based on its descriptive aspect (Donaldson and Preston, 1995). Using the managerial branch of the stakeholder theory, corporate social and environmental disclosure is regarded as a means by which stakeholders are managed to gain support and approval for the organization's continued existence (Gray *et al.*, 1995a) as well as to distract stakeholders' opposition and disapproval (Gray *et al.*, 1996).

Signaling theory has been used in many studies to explain disclosure decisions by managers. However, the theory has been criticized in many respects. The main criticism is made as to the assumption of signaling theory that managers are acting in their own interest. Furthermore, a number of authors criticize the assumption of equal distribution of power. They argue that it is not individuals who exercise power but institutions (Gray *et al.*, 1996). Finally, an attention is drawn as to the empirical difficulty of the signaling process when many parties or multiple users are involved (Newman and Sansig, 1993). Its applicability is questioned especially when investors are less sophisticated and/or when data are unavailable (Abd-Elsalam and Weetman, 2003).

Agency theory ignores the fact that managers have significant motives to conceal adverse information or manipulate results in order to maximize their benefits (Ghazali, 2004). Okcabol and Tinker (1993) indicate that this theory fails to account for non-financial motivations for suppressing disclosure. Moreover, Crowther and Jatana (2005) consider agency theory as a cause of failure in corporate governance. They indicate that there may be no relationship between the principal and agent. In other words, there is no requirement or even expectation that a shareholder will remain shareholder for extended period of time. This highlights the wider concept of stakeholder theory, where there are other stakeholders that represent the principal under this theory even if the shareholder has not keep shares for

extended period of time. In addition, the authors indicated another deficiency of agency theory, where managers under share option schemes may be considered also as principals.

Both agency theory and signaling theory are derived from a pure economic approach. Unlike the socio-political approach, which takes into consideration the relationship with society and other organizations, a pure economic approach suffers from several limitations. It is based on the desire for income and avoiding loss (Bedford, 1973). Consequently, it concentrates on profit maximization as the primary goal of the organization (Huse and Rindova, 2001) ignoring the other organisational goals. Focusing on monetary or wealth considerations limits the scope of relevant environmental disclosure as well as its intended purpose (Cormier *et al.*, 2005). In addition, a pure economic approach concentrates on only two groups of stakeholders; i.e. managers and shareholders, and pays no attention to other interested parties in the society, such as creditors, suppliers, government, taxation authorities and consumer groups. This approach has also been criticized in that "the economic domain cannot be studied in isolation from the political, social and institutional framework within which the economic takes place" (Gray *et al.*, 1995a: 52). Furthermore, economic theories are based on the assumption of efficient capital markets, which practically might not always be the case. This is in addition to the fact that many potential users of environmental information may not evolve in these markets at all (Cormier *et al.*, 2005).

In contrast, social-political theories provide a more comprehensive perspective on environmental disclosure as they explicitly recognize that an organization's economic activity takes place within the society's political, social and institutional framework (Cormier and Gordon, 2001; Deegan *et al.*, 2002; Gray *et al.*, 1995a; O'Donovan, 2002; O'Dwyer, 2002; Patten, 1991; Roberts, 1992). Most interesting and informative insights into social and environmental disclosure are drawn from the use of these theoretical perspectives, which argue that environmental disclosure is a way to legitimize an organization's operations and a means to manage its stakeholders in order to gain support and approval for the organization's continued existence (Cormier *et al.*, 2005; Gray *et al.*, 1995a). In practice, environmental disclosures are being used by companies to determine the companies' relationships with society in general and the environmental pressure groups in particular (Gray *et al.*, 1995c). Moreover, there is evidence that firms will react to outside events to enhance corporate image and respond to stakeholders' demands; for example, firms modified their disclosure practices

following major environmental disasters such as Bhopal and Exxon Valdez oil spill, (Blacconiere and Patten, 1994; Walden and Schwartz, 1997).

A significant contribution to literature has been made by Hill and Jones (1992) to develop stakeholder-agency theory. The integration of the stakeholder concept with agency theory has widened the principal-agent paradigm of financial economics. Hill and Jones (1992) contend that, unlike earlier theories, the stakeholder-agency paradigm explicitly focuses on the causes of conflict between managers and stakeholders. In addition, stakeholder-agency theory embraces and highlights the concepts underlying the adjustment mechanisms that realign management and stakeholders interests in case of conflict of such interests. Managing these conflicts necessitates the use of voluntary disclosure, particularly environmental disclosure, by managers to communicate with stakeholders and to acquire their support (Watson *et al.*, 2002). Different stakeholders have different priorities and need different information. Moreover, their ability to get information is different. Therefore, effective use of disclosure policy, in terms of both quantity and quality, may help in building trust with the shareholders and other stakeholders. Hence, stakeholder-agency theory may provide some useful insights to the current research.

3.3 THE ROLE OF CORPORATE GOVERNANCE IN DETERMINING CORPORATE ENVIRONMENTAL DISCLOSURE

Based on the discussion of the different theoretical perspectives, stakeholder-agency theory provides an appropriate justification and suitable conceptual framework for the present study expecting corporate governance mechanisms to have a significant effect on corporate environmental reporting practices in the UK. Stakeholder-agency theory is adopted as the study's theoretical framework because the study seeks to understand to what extent the variables of interest may influence organizational actions in responding to various stakeholder groups. Hence, stakeholder-agency theory may provide some useful insights to the current research.

The present study explores the relationship between corporate governance and environmental disclosure. The study argues that there is a need to consider the relationship between a company and its stakeholders, as defined by corporate governance structures, when forming

the environmental policy of an organization. Corporate governance systems are expected to affect environmental disclosure by addressing diverse stakeholders. Hence, corporate governance is considered an important mechanism in determining the disclosure required for satisfying the information needs of various stakeholders as it is the board of directors that manages information disclosure in annual reports (Gibbins *et al.*, 1990; Gul and Leung, 2004; Haniffa and Cooke, 2005).

Corporate environmental responsibility can be seen as strategy adopted by a company to satisfy the environmental expectations of diverse stakeholders. According to the stakeholder theory, environmental reporting helps organizations in communicating the environmental dimensions of their activities. Environmental disclosure is therefore regarded as part of the dialogue between the company and its stakeholders (Gray *et al.*, 1995a). According to the agency theory, however, disclosure can help mitigate various principal-agent conflicts through sound corporate governance systems.

Based on stakeholder-agency theory, the study's argument can be put forward as follows. Companies are increasingly considering the importance of demonstrating commitment to environmental responsibility, through the provision of comprehensive and high-quality environmental disclosure as means of managing their relationships with stakeholders. In this respect, sound systems of corporate governance are serving as accountability mechanisms, by which companies are made responsive to the rights and needs of stakeholders, through reducing information asymmetry. Therefore, it can be argued that the quantity and quality of corporate environmental disclosure directed to various stakeholders are enhanced when managers' opportunistic manipulation is monitored by corporate governance mechanisms.

The stakeholder concept serves as a key to environmental responsibility. Although only owners have the right to change the business's objectives, every stakeholder can influence business conduct (Sternberg, 1997). The author argues that every stakeholder can contribute to the economic success or wellbeing of a business by choosing whether or not, and to what extent, to support that particular business. Stakeholders should ensure that their individual choices accurately reflect their views as to how business should be conducted. When each potential stakeholder dutifully and strategically bestows or withholds his economic support according to his moral values, including those of environmental responsibility, then the operation of the market forces will automatically lead businesses to reflect those values

(Sternberg, 1997). Hence, environmental responsibility is embedded and reflected in such principled stakeholding.

Corporate disclosure, in general, is viewed as a means of influencing perceptions regarding the future prospects of the firm in the minds of various stakeholders (Brammer and Pavelin, 2006). The authors argue that disclosing value-relevant information to interested parties reduces information asymmetries between the firm and its stakeholders. Environmental disclosure, in particular, is regarded as a means of responding to specific stakeholders' demands for information. Managers are motivated to make such disclosures since failure to provide this necessary information may reduce their discretion over future investment opportunities (Shane and Spicer, 1983; Watts and Zimmerman, 1978). Since stakeholder-agency theory is based on the notion of accountability, any response by management must be accompanied by disclosure. If the stakeholder-agency theory correctly describes the disclosure decision process, then an effective disclosure policy requires management to keep track of different stakeholder-informational needs; consider the relative importance of different stakeholder groups; and tailor environmental disclosure accordingly.

Stakeholder-agency theory suggests that organizational survival and success is contingent on satisfying both its economic (e.g. profit maximization) and non-economic (e.g. corporate social and environmental performance) objectives by meeting the needs of the company's various stakeholders and addressing their concerns (Pirsch *et al.*, 2007). Under this perspective, corporate environmental disclosure is regarded as a means by which stakeholders are managed to gain support and approval for the organization's continued existence (Cormier *et al.*, 2005; Gray *et al.*, 1995a) and to distract stakeholders' opposition and disapproval (Gray *et al.*, 1996) as well as to discharge accountability (Deegan, 2002). In addition, corporate environmental disclosure represents a strategy to respond to the expectations of various stakeholders and society in general (Gray *et al.*, 1995a; Guthrie and Parker, 1989). In order to successfully implement this strategy, the quantity and quality of such environmental information must be sufficient. Companies disclose voluntary information regarding the environmental dimensions of their activities as a means of demonstrating the overall creation of value and being accountable to stakeholders and society in general (Freeman and Velamuri, 2006).

Similarly, corporate governance has been addressed as an important mechanism of accountability (Aguilera *et al.*, 2006). In this respect, the board of directors acts as a link

between the company and its stakeholders. Hence, board of directors and other corporate governance mechanisms may represent a valuable source of accountability. Transparency, being a key element of accountability, is a significant indicator of the standard of corporate governance in an economy (Ho and Wong, 2001). According to Gul and Leung (2004), corporate transparency has been directly linked to strong corporate governance. Sound governance systems, designed and administered to protect stakeholders interests, would accurately disclose relevant information, thereby increasing company transparency and directors' accountability.

Therefore, corporate governance is viewed as effectively outlining the rights and responsibilities of each group of stakeholders in the company (Ho and Wong, 2001). Similarly, Demb and Neubauer (1992: 187) stated that "Corporate Governance is the process by which corporations are made responsive to the rights and wishes of stakeholders". Monks and Minow (1995: 1) argued that "It is the relationship among various participants in determining the direction and performance of corporations". While, Tricker (1994: xi) wrote that "Corporate governance addresses the issues facing board of directors such as the interaction with top management and relationships with the owners and others interested in the affairs of the company, including creditors, debt financiers, analysts, auditors, and corporate governance". Under this perspective, the governance structure shifts from a principal-agent to a team production model, and the critical governance tasks become to ensure effective, coordination, cooperation and conflict resolution to maximize, rather than just control and to distribute the value created in ways that maintain commitment multiple stakeholders (Kochan and Rubinstein, 2000).

A stakeholder model relevant to corporate governance is developed by Turnbull (1997). Based on stakeholder-agency theory, he argued that: (a) the purpose of the firm is to create wealth or value for its stakeholders; (b) maximizing total wealth creation by the firm is the responsibility of directors and managers; (c) the key to achieving the firm's purpose is encouraging board representation by significant stakeholders and giving them a direct voice in the governance and control; (d) recognition of both implicit and explicit contractual relationships in a firm; and finally (e) the control of the firm is shared between various stakeholders through multiple boards to remove conflicts of interest and so agency costs. In line with this argument, some authors propose stakeholders engagement, or the representation of diverse stakeholders on corporate boards, in order to safeguard the interests of corporate

stakeholders and to ensure that their concerns are considered in corporate decision-making (Freeman and Evan, 1990; Jones and Goldberg, 1982). Corporate emphasis on stakeholder engagement affects both the volume as well as the quality of voluntary disclosures (Boesso and Kumar, 2007). Therefore, corporate governance concerns the way external stakeholders monitor the management of corporations (Monks and Minow, 1995) and hence, enhance corporate disclosure.

The breakdown of the governance relation between shareholders, the board and the senior executives was at the heart of major corporate scandals that rocked international businesses throughout 2002 (Heath and Norman, 2004). They argued that this breakdown was due to the failure of these firms and their shareholders to protect themselves against agency problems. In other words, by exploiting information asymmetries and conflicts of interest on the board, senior executives were able to act against shareholders' interests. Therefore, UK Corporate Governance Code (2010), formerly known as the Combined Code, regulates the rights of shareholders and other stakeholders, the duties of boards and board members and the duties that mangers have to the board and the shareholders. One of the most basic rights of shareholders that it regulates is the information disclosure, essentially about the financial performance of the firm, but also potentially about its social and environmental policies and activities (Heath and Norman, 2004).

The extent to which corporate governance and corporate social and environmental disclosure are converging depends on views on corporate governance (Kolk and Pinkse, 2010). Corporate governance structures, defining the relationship between a company and its stakeholders, incorporate either one of two corporate worldviews, contractarianism and communitarianism (van der Laan Smith *et al.*, 2005). The communitarian perspective, as opposed to the contractarian perspective, of corporate governance structures holds that a corporation is a social organization having social responsibilities that go beyond achieving economic efficiency. Under this perspective, firms have social and environmental responsibilities towards all their stakeholders, rather than only towards shareholders. Consequently, as the authors argue, managers in communitarian societies are more likely to demonstrate social responsibility and, hence, provide social and environmental disclosure as part of strategically managing stakeholder relationships. This strategy can be referred to as ‘governance-by-disclosure’, where a growing variety of such initiatives can be identified particularly in the global environmental domain (Gupta, 2008).

Corporate environmental disclosure provides information on the impact of a corporation's activities to a broad range of stakeholders. The stakeholder concept is intended to "broaden management's vision of its roles and responsibilities beyond the profit maximization functions to include interests and claims of non-stockholding groups" (Mitchell *et al.*, 1997: 855) and, hence, to include more wider social and environmental functions. Under this approach, the long-term survival of the corporation requires the support and approval of all its stakeholders, which, in turn, requires a dialogue between the management of a corporation and its stakeholders (Dierkes and Antal, 1985). This argument is in line with the principles stipulated by the UK Corporate Governance Code (2010), formerly known as the Combined Code. From a stakeholder-agency perspective, environmental disclosure is thus seen as part of the dialogue between the company and its stakeholders (Gray *et al.*, 1995a).

The development of the best practice recommendations by the UK Corporate Governance Code (2010), formerly known as the Combined Code, closely linked good corporate governance to the concept of corporate social and environmental responsibility accountability. One way to demonstrate good governance is to use the annual report to disclose information - including environmental information – to various stakeholders (Gibson and O'Donovan, 2007). The OECD and the securities regulators of many countries have considered corporate governance and corporate disclosure as inseparable issues (OECD, 2004; UK Corporate Governance Code, 2010). Good corporate governance provides the foundations of good corporate social and environmental disclosure by establishing value-creating relationships with all stakeholders (Welford, 2007). Similarly, Gibson and O'Donovan (2007) reported on the importance of good corporate governance practice in relation to environmental protection escalate, as demonstrated by the introduction of separate environmental sustainability reports, the advent of triple bottom line reporting, changes in environmental legislation and the occurrence of major environmental incidents.

A firm's corporate governance structures or contractual arrangements aimed at reducing agency costs and its disclosure decisions or informational environment evolve simultaneously over time and, therefore, the interaction between both plays an important role in reducing agency costs (Armstrong *et al.*, 2010). Corporate governance mechanisms are designed to align the interests of mangers with those of stakeholders, while corporate disclosure serves as an indirect mechanism of corporate governance (Grüning and Ernstberger, 2010). The authors argue that sound disclosure reduces information asymmetry by providing information

to stakeholders and outside directors, which enables them to enhance the monitoring of a firm's management and, hence, reduce agency costs.

The board of directors is regarded as having a great influence on the environmental performance of the company (Greeno, 1993). Boards of large UK companies are devoting more time to the governance of corporate social and environmental responsibility (Mackenzie, 2007). This argument is consistent with the UK Corporate Governance Code (2010) requirement that the boards set standards and values for companies and ensure they meet their social obligations. In addition, the UK Companies Act 2006 requires the board of directors to consider the impact of the company's operations on the community and the environment (S. 172). Therefore, adoption of various corporate governance mechanisms or internal control devices such as non-executive directors, separation of the roles of the chairman and chief executive, audit committees and corporate social responsibility committees, enhances monitoring quality and reduces benefits from withholding information, which, in turn, improves disclosure quality in financial statements (Forker, 1992).

Accordingly, providing quality disclosures is arguably dependent upon sound corporate governance mechanisms as being responsive to the needs of various stakeholder groups. A company with an effective corporate governance system, therefore, will provide access to relevant and high quality information in an attempt to invite new forms of stakeholder engagement (Eccles *et al.*, 2001). Consistent with this notion, Beekes and Brown (2006) found that better-governed firms do make more informative disclosures. Similarly, Karamanou and Vafeas (2005) and Ajinkya *et al.* (2005) found that well-governed firms are more likely to provide higher quality voluntary management earnings forecasts. Moreover, Rupley *et al.* (2011) found environmental disclosure quality, in particular, to be positively associated with corporate governance mechanisms such as board independence and board expertise. Disclosure quality can, in turn, affect information asymmetry by changing the trading behaviour of uninformed investors and reducing incentives for private information searches (Chang *et al.*, 2008).

Assessing the quality of corporate social and environmental disclosure is "problematic given the diversity of practice that has evolved through a lack of mandatory regulation, sketchy adoption of voluntary guidelines, and variable quality of verification" (Hammond and Miles, 2004). Nevertheless, an important element in assessing environmental disclosure quality is environmental assurance which enhances the perceived credibility of such disclosures

(Moroney *et al.*, 2009; Coram *et al.*, 2009) by providing more reliable environmental information to stakeholders (GRI, 2006). Stakeholders are increasingly demanding that environmental disclosure truly and fairly represents companies' past and future achievements (Gray, 2000), where credible environmental information can be viewed as a central element in corporate responsibility, accountability and governance (Cumming, 2001; Kaler, 2002).

However, the impact of corporate governance mechanisms on corporate disclosure may be complementary or substitutive (Grüning and Ernstberger, 2010; Ho and Wong, 2001). If it is complementary, the stakeholder-agency theory predicts a greater extent of disclosures since the adoption of more governance mechanisms will strengthen the internal control of companies and ensure an intensive monitoring device to reduce opportunism and information asymmetry (Leftwitch *et al.*, 1981; Welker, 1995). This leads to improvement in corporate disclosure quantity and quality (Ho and Wong, 2001). In other words, effective governance mechanisms should increase the likelihood of providing enhanced disclosures by management, which implies a complementary relation between both mechanisms (Grüning and Ernstberger, 2010). Hence, a positive relationship between corporate governance and corporate disclosure is expected. On the other hand, if the relationship is substitutive, more governance mechanisms will not be accompanied by more disclosures since one corporate governance mechanism may substitute another one. In this regard, there would be a trade off between the costs and benefits of additional disclosure where managers strategically decide on the appropriate level of corporate governance and disclosure (Grüning and Ernstberger, 2010). Hence, the adoption of additional corporate governance mechanisms may not affect disclosure level or even reduce the need for enhanced disclosure. Despite this theoretical debate, Hill (1999) argues that no one single mechanism is a governance solution and suggests the desirability of having a system of overlapping checks and balances. Therefore, it can be argued that employing several corporate governance mechanisms is essential to the proper functioning of a corporation and would ultimately result in comprehensive and high quality disclosure.

Hill and Jones (1992) contend that, unlike earlier theories, the stakeholder-agency theory explicitly focuses on the causes of conflict between managers and stakeholders. In addition, stakeholder-agency theory embraces and highlights the concepts underlying the adjustment mechanisms that realign management and stakeholders interests in case of conflict of such interests. Managing these conflicts necessitates the use of voluntary disclosure, particularly

environmental disclosure, by managers to communicate with stakeholders and to acquire their support (Watson *et al.*, 2002). Different stakeholders have different priorities and need different information. Moreover, their ability to get information is different. Therefore, effective use of disclosure policy, in terms of both quantity and quality, may help in building trust with shareholders and other stakeholders. Hence, stakeholder-agency theory may provide some useful insights to the current research.

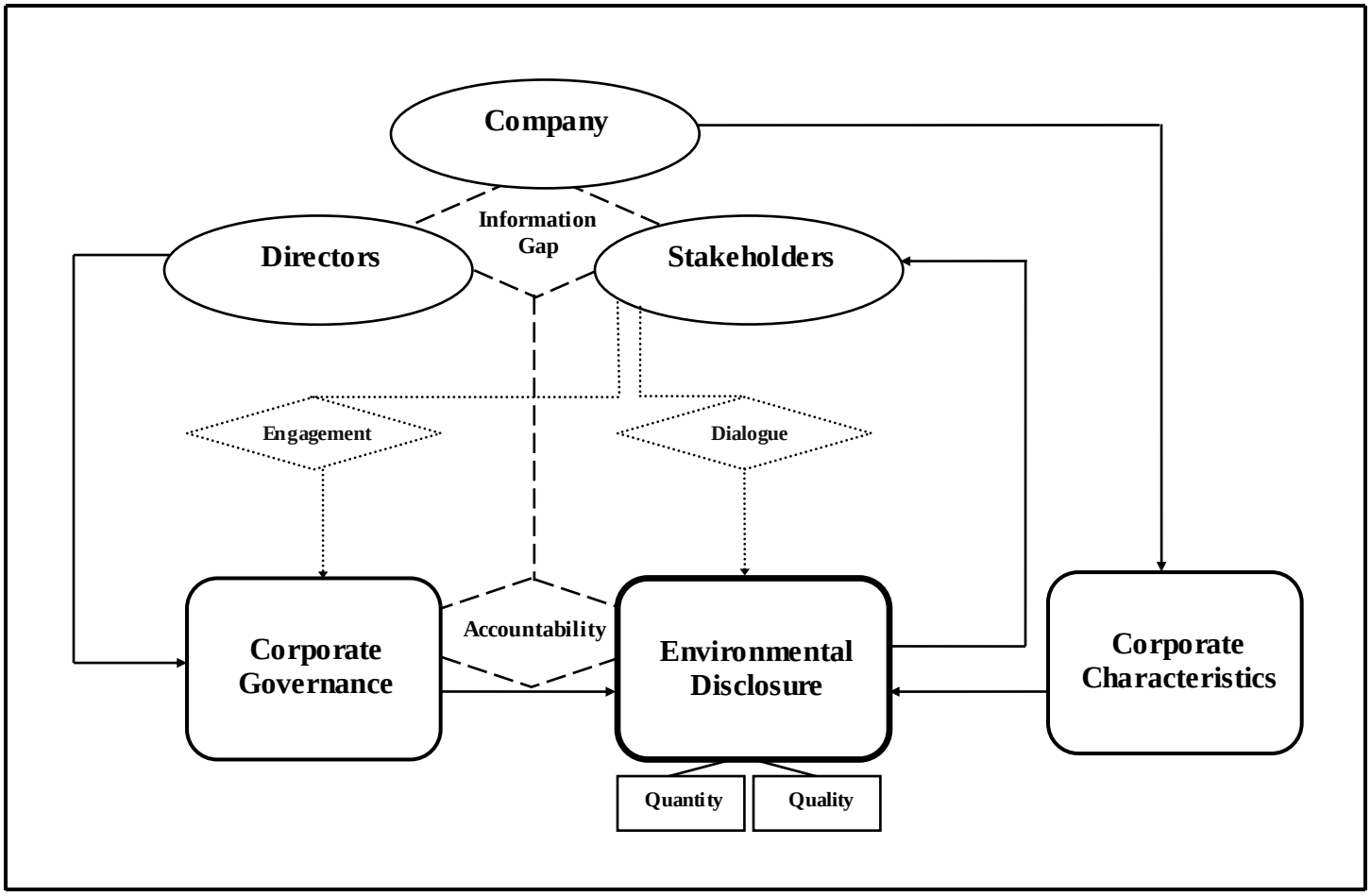
Last, and not least, it can be simply stated as follows. The codes of corporate governance primarily concern the accountability issue analyzing how to ensure that top management is properly oversight by stakeholders. Similarly, corporate environmental disclosure concerns the accountability issue attempting to satisfy the environmental information needs of stakeholders. Since both corporate governance and corporate environmental disclosures are based on the notion of accountability, then the two concepts are intimately linked because a better accountability of top management turns into an increasing level of stakeholders' environmental information satisfaction. Accordingly, corporate governance is expected to affect corporate environmental disclosure by addressing diverse stakeholders.

Based on the above discussion, the present study claims that environmental disclosure may be a function of corporate governance characteristics. In other words, it investigates the effect of corporate governance mechanisms, after controlling for company-specific characteristics, on the quantity and quality of corporate environmental disclosures in the annual reports of UK companies. Stakeholder-agency theory is adopted as the study's theoretical framework because the study seeks to understand to what extent the variables of interest may influence organizational actions in responding to various stakeholder groups. Corporate governance structures define the relationship between a company and its stakeholders as the company is a legal entity expected to fulfill certain environmental responsibilities (van der Laan Smith *et al.*, 2005). Therefore, environmental disclosures quantity and quality can be function of corporate governance in the sense that managers who have better access to a firm’s information than stakeholders can make comprehensive and credible disclosure to enhance firm value by reducing agency costs; environmental disclosure being one of monitoring devices used to reduce such costs.

The following figure depicts the suggested theoretical framework of the current study:

Figure 3.1

Suggested Theoretical Framework



At the heart of the analysis is corporate environmental disclosure. Figure 3.1 portrays the relationship between corporate governance and environmental disclosure, as controlled by corporate characteristics. Based on stakeholder-agency theory, it is argued that corporate environmental disclosure directed to various stakeholders is enhanced when managers' opportunistic manipulation is monitored by corporate governance mechanisms. As shown in the figure, stakeholders link to the company either through engagement or dialogue. Stakeholders' engagement with the company takes place through participating in corporate governance systems and ownership structures. Stakeholders' dialogue with the company takes place partially through environmental disclosure where companies report on their

environmental performance. These links allow a correspondence between stakeholders' expectations and company's behavior, thereby enhancing the quantity and quality of environmental disclosure. Accordingly, corporate governance mechanisms adopted by the company give an indication about how stakeholders' interests are considered at the board level, as reflected in environmental disclosure practices.

Figure 3.1 highlights an important element in the existing linkage among the considered variables, that is, accountability. Both governance and environmental disclosure are based on the notion of accountability. A better accountability of top management turns into an increasing level of stakeholders' environmental information satisfaction. It is the board of directors who decides the definition of the accountability of the company, thereby affecting the environmental disclosures reported to stakeholders. In addition, by establishing external links with stakeholders, directors attract valuable resources vital to the companies' viability (Michelon and Parbonetti, 2010).

An information gap, also referred to as information asymmetry, exists between directors and stakeholders due to absence of information or manipulation of the disclosed information, resulting in failure to satisfy stakeholders' expectations towards the firm's disclosure (Hooks *et al.*, 2002). Voluntary disclosures, including environmental disclosure, diminish informational asymmetries between a firm and its stakeholders (Brammer and Pavelin, 2008). It reduces the information gap as it provides stakeholders with relative confidence that the stock transactions occur at a fair price which increase stock liquidity (Diamond and Verrecchia, 1991; Kim and Verrecchia, 1994). In addition, voluntary disclosure reduces uncertainty and, hence, reduces the information asymmetry which, in turn, reduces the cost of external financing (Healey and Palepu, 2001). Such "stakeholder reporting can also be viewed as a significant strategic tool that is used by management to improve communication with a company's stakeholders, providing a foundation for trust and openness" (Boesso and Kumar, 2007: 278-279). Accordingly, enhancing the quantity and quality of environmental disclosure is considered to be an effective means of reducing the information gap.

The Global Reporting Initiative (GRI) states that "A primary goal of reporting is to contribute to an ongoing stakeholder dialogue. Reports alone provide little value to inform stakeholders or support a dialogue that influences the decisions and behavior of both the reporting organization and its stakeholders" (GRI, 2002: 9). Alternatively, accountability supports stakeholders' relationship with the firm by providing information for different decisions.

Therefore, accountability narrows the information asymmetry between the management and different stakeholders, and in between the different categories of stakeholders (Lev, 1989). Figure 3.1 highlights this important linkage, where accountability would increase the awareness towards the complexity of information disclosures and, hence, would reduce the information gap or asymmetry.

Based on the above considerations and given the absence of significant corporate governance variables in environmental disclosure studies, important relationships should exist among different mechanisms of accountability. Therefore, the present study aims at empirically examining the impact of corporate governance mechanisms, after controlling for company-specific characteristics, on the quantity and quality of corporate environmental disclosures in the annual reports of UK companies. The study is based on stakeholder-agency theory as a basic motive for the efforts made to reduce the information gap by reaching stakeholders' expectations about environmental disclosure through sound corporate governance structures.

3.4 CONCLUSION

This chapter presents the different theoretical frameworks that have been used in the accounting literature to explain and analyze each of environmental disclosure practices and corporate governance mechanisms. Although there is much variation in the theoretical perspectives being adopted, prior research from a wide spectrum of theoretical backgrounds has acknowledged that good corporate governance is associated with increased transparency and credible disclosure (see Ajinkya *et al.*, 2005; Cormier *et al.*, 2010; Dunstan, 2008; Gul and Leung, 2004). Three prominent theories have dominated the explanations of social and environmental disclosure practices. These are stakeholder theory, legitimacy theory and political economy theory. In addition, signaling theory has been introduced as a possible explanation of voluntary disclosure practices, of which environmental disclosure is a significant category. Reviewing corporate governance literature, however, it can be noticed that agency theory and stakeholder theory are the dominant theories. The main distinction between these theories is in the perspective from which they are viewed and examined.

All of the three socio-political theories of corporate social disclosure are linked to the notion of the existence of a social contract between the organisation and society, whereby a firm is

being held responsible and accountable to its entire stakeholders (Gray *et al.*, 1996). They suggest that the extent of social and environmental disclosure is dependent on the exposure to public pressure in the social and/or political environment in the form of social or regulatory changes (Patten, 2002), Therefore, it has been argued that these theories are overlapping and complementary rather than competing as such (Gray *et al.*, 1995a). These theories, however, "are not as yet fully fledged theories ... but provide useful frameworks within which to study the developing practice of CSR" (Gray *et al.*, 1996: 49). Accordingly, there has been a tendency by some researchers to rely upon more than one theory in providing an explanation for managerial behaviour (Fiedler and Deegan, 2002).

Unlike the socio-political approach, which takes into consideration the relation with society and other organizations, a pure economic approach, from which both agency theory and signaling theory are derived, suffers from several limitations. It concentrates on profit maximization as the primary goal of the organisation ignoring the other organisational goals. Focusing on monetary or wealth considerations limits the scope of relevant environmental disclosure as well as its intended purpose (Cormier *et al.*, 2005). In addition, a pure economic approach concentrates on only two groups of stakeholders; i.e. managers and shareholders, and pays no attention to other interested parties in the society. This approach has also been criticized in that "the economic domain cannot be studied in isolation from the political, social and institutional framework within which the economic takes place" (Gray *et al.*, 1995a: 52). Furthermore, economic theories are based on the assumption of efficient capital markets, which practically might not always be the case. This is in addition to the fact that many potential users of environmental information may not evolve in these markets at all (Cormier *et al.*, 2005).

However, unlike earlier theories, the stakeholder-agency paradigm explicitly focuses on the causes of conflict between managers and stakeholders (Hill and Jones, 1992). In addition, stakeholder-agency theory embraces and highlights the concepts underlying the adjustment mechanisms that realign management and stakeholders interests in case of conflict of such interests. Managing these conflicts necessitates the use of voluntary disclosure, particularly environmental disclosure, by managers to communicate with stakeholders and to acquire their support (Watson *et al.*, 2002). Different stakeholders have different priorities and need different information. Moreover, their ability to get information is different. Therefore, effective use of disclosure policy, in terms of both quantity and quality, may help in building

trust with shareholders and other stakeholders. Hence, stakeholder-agency theory may provide some useful insights to the current research.

There is a need to consider the relationship between a company and its stakeholders, as defined by corporate governance structures, when forming the environmental policy of an organization. Corporate governance systems are expected to affect environmental disclosure by addressing diverse stakeholders. Hence, corporate governance is considered an important mechanism in determining the disclosure required for satisfying the information needs of various stakeholders as it is the board of directors that manages information disclosure in annual reports (Gibbins *et al.*, 1990; Gul and Leung, 2004; Haniffa and Cooke, 2005).

The codes of corporate governance primarily concern the accountability issue analyzing how to ensure that top management is properly oversight by stakeholders. Similarly, corporate environmental disclosure concerns the accountability issue attempting to satisfy the environmental information needs of stakeholders. Since both corporate governance and corporate environmental disclosures are based on the notion of accountability, then the two concepts are intimately linked because a better accountability of top management turns into an increasing level of stakeholders' environmental information satisfaction. Accordingly, corporate governance is expected to affect corporate environmental disclosure by addressing diverse stakeholders.

The present study examines the relationship between corporate governance mechanisms and the quantity and quality of corporate environmental disclosure practices in UK companies' annual reports. Based on stakeholder-agency theory, the study's argument can be put forward as follows. Companies are increasingly considering the importance of demonstrating commitment to environmental responsibility, through the provision of complete and qualified environmental disclosure as means of managing their relationships with stakeholders. In this respect, sound systems of corporate governance are serving as accountability mechanisms, by which companies are made responsive to the rights and needs of stakeholders, through reducing information asymmetry. Therefore, it can be argued that the quantity and quality of corporate environmental disclosure directed to various stakeholders are enhanced when managers' opportunistic manipulation is monitored by corporate governance mechanisms, thereby reducing the information expectation gap.

However, this argument needs to be examined empirically. Therefore, the empirical part of the study is concerned with examining the validation of this theoretical argument. The theoretical framework is carried through the thesis with the aim of revisiting it in light of the results of the empirical study. The next chapter presents the research methodology along with the development of the research hypotheses.

Chapter 4

RESEARCH METHODOLOGY

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 INTRODUCTION

Reviewing the relevant literature and outlining the proposed theoretical framework for the study help in making the necessary methodological choices and constructing the appropriate research design. Based on stakeholder-agency theory, the main objectives of the present study is to empirically examine the relationship between corporate governance mechanisms and the quantity and quality of corporate environmental disclosure practices in UK companies' annual reports and to provide an in-depth investigation of environmental disclosure quality identification and assessment. The methodology to be followed in the study's empirical investigation is justified in light of the philosophical and methodological viewpoints adopted by the current research. The methodology shows the linkage between the two empirical studies to be undertaken in the current research and highlights the critical importance of investigating issues as environmental disclosure quality identification and assessment that are still relatively unexplored.

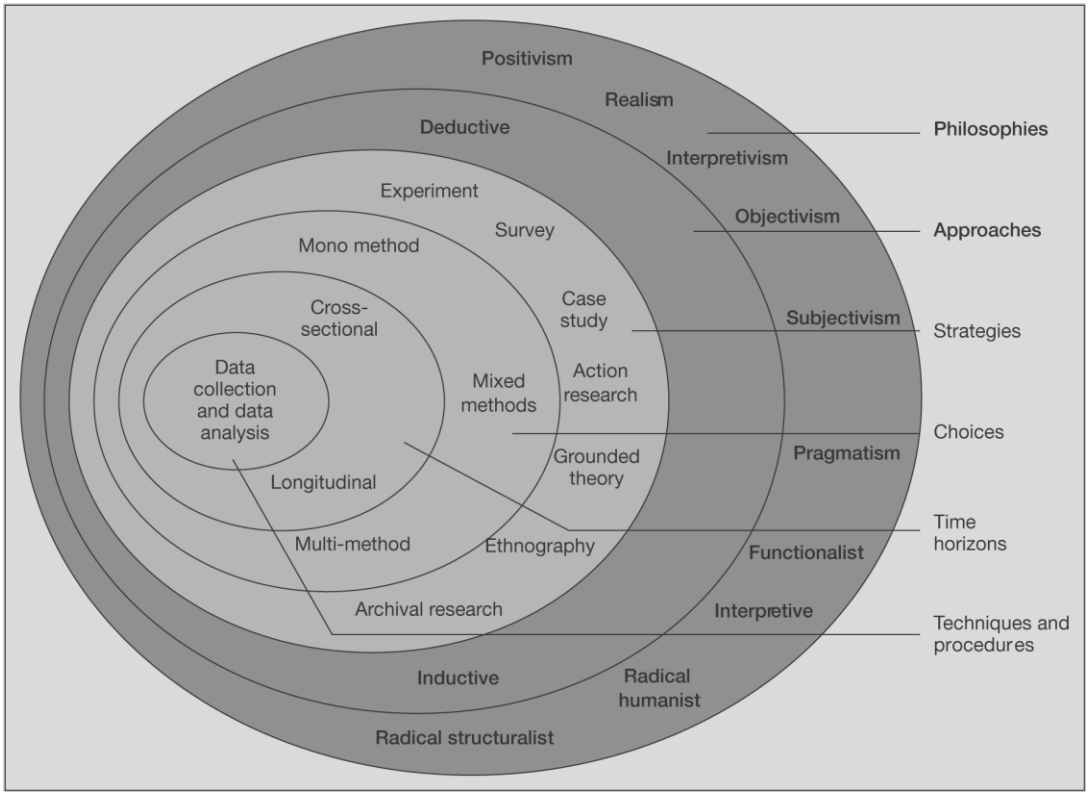
This chapter explains in detail the methodology employed by the present study based on the purpose and objectives of the study. It commences with explaining the research philosophy or the methodological viewpoint of the research and how this verifies the choice of methods to be used in carrying out the study. Research design, then, provides a description of the research methods employed, while providing substantiation for using the content analysis method in undertaking the research. Quantitative analysis, using content analysis of a sample of UK companies' annual reports, is used to examine the quantity and quality of corporate environmental disclosure practices and their association with corporate governance mechanisms. In doing so, the study distinguishes between the different categories or areas of activity to which environmental disclosure relates as well as between the different types of environmental information content.

4.2 RESEARCH PHILOSOPHY

Bogdan and Taylor (1975: 1) define the term 'methodology' as "the process, principles, and procedures by which we approach problems and seek answers". The research process involves a number of steps that can be viewed as layers of a research onion. The research onion consists of six layers namely, research philosophies, approaches, strategies, choices, time horizons, techniques and procedures (Saunders *et al.*, 2007). Each layer includes different set of choices that the researcher is required to choose among as fits with the purpose of the research. In other words, any research should be based on specific philosophical assumptions that are either implicitly or explicitly expressed which lead to the choice of the methodology adopted (Gill and Johnson, 1997). Figure 4.1 depicts the research onion.

Figure 4.1

The Research Onion



Source: Adopted from Saunders *et al*. (2007: 102)

The first layer of the research process is research philosophy. The term research philosophy refers to the development of knowledge and the nature of that knowledge (Saunders *et al.*, 2007). Methodological choices of any research are mainly determined by the philosophical assumptions of ontology (realism v. nominalism), epistemology (positivism v. anti-positivism), human nature (determinism v. voluntarism) and methodology (nomothetic v. ideographic) (Burrell and Morgan, 1979; Morgan and Smircich, 1980). These four assumptions are related to the nature of social science. Two polars of methodological choices, based on these assumptions, are the objective and subjective dimensions (Burrell and Morgan, 1979).

'Ontology' is concerned with assumptions about what constitutes social reality (Blaikie, 1993). In other words, it is the theory of being (Marsh and Stoker, 2002). Burrell and Morgan (1979) identified two contrasting ontological positions, namely realism and nominalism. Realism considers the social world as a compound of real and tangible structures, while nominalism regards the social world as being made up of names, concepts and labels that give a structure to reality. The nominalism assumption considers the social world as being external to individual recognition. Accordingly, no objective reality exists in case of nominalism, and therefore, this ontological position requires the construction of research objectives (Iskander, 2008).

'Epistemology' is concerned with assumptions about what constitutes knowledge of social reality (Blaikie, 1993). In other words, it is the theory of knowledge (Marsh and Stoker, 2002). Burrell and Morgan (1979) identified two contrasting epistemological positions, namely positivism and anti-positivism. Positivism seeks to explain and predict what happens in the social world, by searching for regularities and causal relationships between its constituent elements (Burrell and Morgan, 1979). Accordingly, theory is used to generate hypotheses that can be examined. Therefore, the role of research is to test theories and further develop these theories if possible (Bryman and Bell, 2007; Saunders *et al.*, 2007). On the other hand, anti-positivism advocates that it is necessary for the researcher to understand the differences between humans as social actors (Burrell and Morgan, 1979). While under positivism the research can produce generalizations, anti-positivism argues that generalisability is not of crucial importance (Bryman and Bell, 2007; Saunders *et al.*, 2007).

'Human nature' assumptions are concerned with the relationship between human beings and their environment. Burrell and Morgan (1979) identified two contrasting human nature positions, namely determinism and voluntarism. Determinism postulates that humans and their activities are completely determined by the situation or environment in which they are located. Voluntarism, on the other hand, assumes that humans are completely autonomous and free willed who create the environment rather than being determined by it.

'Methodology' is concerned with the methods used to investigate and learn about the social world. Burrell and Morgan (1979) identified two contrasting methodological positions, namely nomothetic and ideographic. The nomothetic approach emphasizes the importance of basing research upon systematic protocol and technique and involves a rigorous and scientific testing of the hypotheses. On the other hand, the ideographic approach assumes that one can only understand the social world by obtaining first hand knowledge of the subject under investigation. It involves the analysis of subjective data that the researcher generates by participating or getting inside the situations (Burrell and Morgan, 1979; Gill and Johnson, 1997; Belkaoui, 2004).

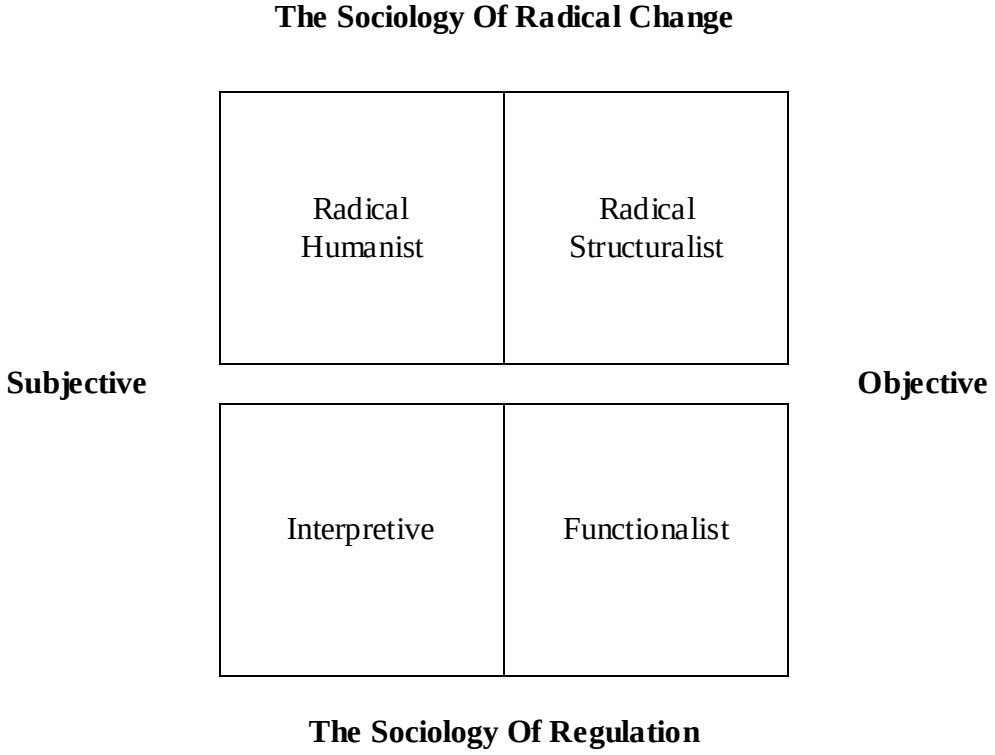
In addition to the four assumptions regarding the nature of social science, two further assumptions are related to the nature of society, namely radical change and regulation. Radical change is concerned with assumptions about the way organizational affairs should be conducted and provides suggestions as to how these affairs may be conducted in order to make fundamental changes to the normal order of things. On the other hand, regulation explains the way organizational affairs are regulated and provides suggestions as to how they may be improved within the current framework. Accordingly, radical change adopts a critical perspective on organizational life, while the regulatory perspective is less judgmental and critical. In other words, radical change addresses organizational problems from the viewpoint of the existing state of affairs, while regulation approaches them within the existing state of affairs (Burrell and Morgan, 1979; Saunders *et al.*, 2007).

Based on the two polars of assumptions regarding the nature of social science; the objective and subjective dimensions and two assumptions regarding the nature of society; radical change and regulation dimensions, research paradigms can be used to

distinguish between different visions of accounting research (Belkaoui, 2004). 'Paradigm' is a way of examining social phenomena from which understandings and explanations can be gained (Saundres *et al.*, 2007). Burrell and Morgan (1979) distinguish between four research paradigms for the analysis of social theory; namely radical humanist, radical structuralist, interpretive, and functionalist. Figure 4.2 depicts the four research paradigms.

Figure 4.2

Four Paradigms For The Analysis Of Social Science



Source: Adopted from Burrell and Morgan (1979: 22)

The radical humanist paradigm, located at the top left corner, represents the subjective and radical change dimensions. This paradigm adopts a critical perspective on organizational life and is concerned with changing the existing status. In addition, it implies a subjective approach to social science; nominalism, anti-positivism, voluntarism and ideographic.

The radical structuralist paradigm, located at the top right corner, also seeks fundamental change to the existing state but lends itself to the objective approach to social science; realism, positivism, determinism, and nomothetic.

The interpretive paradigm, located at the bottom left corner, represents the regulatory approach which seeks to explain organizational affairs and offers suggestions for improvement by discovering irrationalities. Its concern is to understand and explain what is going on rather than achieving change. Moreover, this paradigm implies a subjective approach to social science; the nominalist, anti-positivist, voluntarist and ideological positions.

The functionalist paradigm, located at the bottom right corner, represents the regulatory approach and the objective dimension. This paradigm assumes that organisations are rational entities, in which rational explanations provide rational solutions to rational problems (Saunders *et al.*, 2007). In addition, it implies an objective approach to social science; realism, positivism, determinism, and nomothetic.

4.3 RESEARCH APPROACH

Moving to the second layer of the research process, research approaches are classified into deductive and inductive (Saunders *et al.*, 2007). Sekaran (2003: 27) defines deduction as "the process by which we arrive at a reasoned conclusion by logical generalization of a known fact" while induction is defined as "a process where we observe certain phenomena and on this basis arrive at conclusions".

The deductive approach begins with the development of testable hypotheses and ends with examining the outcome of the inquiry, which leads to either confirming the

theory or modifying the theory in the light of the findings (Robson, 2002). This, in turn, requires the collection of quantitative data, or even qualitative data, to test the developed hypotheses using a highly structured methodology to facilitate replication of the findings (Gill and Johnson, 2002). Therefore, the deductive approach aims at testing the theory underlying the phenomena being examined.

The inductive approach, on the contrary, begins with the collection and then the analysis of data, the result of which would lead to the formulation of a theory. Consequently, the theory would follow data rather than vice versa in case of the deductive approach (Saunders *et al.*, 2007). Therefore, the inductive approach aims at building the theory underpinning the phenomena being examined.

Bryman and Bell (2007) indicate that the deductive approach is related to quantitative research that follow objectivism; ontological realism and epistemological positivism. In contrast, the inductive approach is related to qualitative research that follow subjectivism; ontological nominalism and epistemological anti-positivism.

4.4 METHODOLOGICAL CHOICES

At one extreme is the objective approach, where the nomothetic methodology is a product of realist ontology and positivist epistemology (Burrell and Morgan, 1979). The realist ontology assumes that reality of the social world exists externally (Easterby-Smith *et al.*, 1991), independent of an individual's perceptions and appreciations. The positivist epistemology underpins this approach where what happens in the social world is sought to be explained and predicted by searching for laws, causal relationships and regularities between its constituent elements (Burrell and Morgan, 1979). In this regard, valid knowledge is that which is observable and measurable and, hence, is deemed objective and independent (Hussey and Hussey, 1997). Reality should, thus, be measured objectively rather than subjectively examined (Easterby-Smith *et al.*, 1991). The human nature assumption underlying the nomothetic methodology is determinism, where humans and their activities are completely determined by the situation or environment in which they are located (Burrell and Morgan, 1979). Therefore, following the nomothetic methodology, the

researcher is independent of the phenomena being studied (Easterby-Smith *et al.*, 1991).

All of the assumptions of a nomothetic methodology, thus, normally lead to the use of quantitative methodologies as the researcher attempts to search measurable observations to investigate things (Bogdan and Taylor, 1975; Creswell, 1998; Hussey and Hussey, 1997) and thus, obtaining second-hand knowledge or secondary data of the phenomena being studied. Generally, the quantitative researcher works deductively, for example, specifying subject categories in advance prior to starting the empirical research rather than developing them from subjects (Creswell, 1998). Accordingly, the researcher concentrates on measurement of the subject under investigation rather than gaining participants' interpretation (Easterby-Smith *et al.*, 1991; Hussey and Hussey, 1997).

At the other extreme is the subjective approach, where the ideographic methodology, is a product of nominalist ontology and anti-positivist epistemology (Burrell and Morgan, 1979). Accordingly, an ideographic methodology assumes that something is real when it is socially constructed (Hines, 1988) in the minds of the actors or participants involved in the situation (Creswell, 1998). The nominalist ontology assumes that reality is not external to individual recognition (Hussey and Hussey, 1997) and is socially constructed rather than objectively determined (Easterby-Smith *et al.*, 1991). The anti-positivist epistemology advocates that it is necessary for the researcher to understand the differences between humans as social actors (Burrell and Morgan, 1979). In this regard, knowledge can be identified through what is experienced by respondents and, hence, is deemed subjective and not independent of observation (Morgan and Smircich, 1980). The human nature assumption underpinning the ideographic methodology is voluntarism, where humans are completely autonomous and free willed who create the environment rather than being determined by it (Burrell and Morgan, 1979). Therefore, following the ideographic methodology, the researcher is not independent of the phenomena being studied but rather interacts with participants through spending time in the field (Creswell, 1998).

All of the assumptions of an ideographic methodology, thus, normally lead to the use of qualitative methodologies as the researcher attempts to rely on and investigate things from the participants' own viewpoints (Bogdan and Taylor, 1975; Creswell,

1998; Hussey and Hussey, 1997) and thus, obtaining first-hand knowledge or primary data of the phenomena being studied. Generally, the qualitative researcher works inductively, for example, developing categories from subjects rather than specifying them in advance prior to starting the empirical research (Creswell, 1998). Accordingly, the researcher concentrates on meaning and interpretation given by participants rather than measurement of the subject under investigation (Easterby-Smith *et al.*, 1991; Hussey and Hussey, 1997).

However, Laughlin (1995) suggests the choice of some form of 'middle-range' methodological position, rather than following one of the extreme forms. He argues that the extreme or pure forms of the philosophical assumptions of ontology, epistemology, human nature and methodology do not exist. Adopting a middle-range position allows the researcher to employ a variety of research methods, such as using both quantitative and qualitative methods, to undertake the empirical investigations (also see Silverman, 1997). In a similar vein, Burrell and Morgan (1979) argue that although, the distinction between the two methodological positions may be very clear at the philosophical level, however, when reaching research design issues such as the use of quantitative or qualitative, this division breaks down. This provides more perspectives on and deeper understanding of the phenomena under investigation.

Moving to the choice of the research paradigm, the researcher can start with recalling the research objective and the relative uses of each of the four research paradigms used in the analysis of social theory; namely radical humanist, radical structuralist, interpretive, and functionalist. If the objective of the research is to examine the existing status of the phenomena under investigation, then the radical humanist and radical structuralist paradigms would be irrelevant to the study. The interpretive paradigm, however, suffers from a number of limitations; where it postulates that the researcher can understand the phenomena being investigated through mere subjectivity and without interference, it fails to be an inquiry of change, and it creates the illusion of pure theory by using a monological reasoning (Belkaoui, 2004). The functionalist paradigm is the dominant paradigm in the business and management research (Saunders *et al.*, 2007). It assumes the separation between theory and observations used to test the theory, employing the hypothetic-deductive approach and quantitative methods in data collection and analysis (Belkaoui, 2004).

However, a number of authors argue that a uniquely correct paradigm can not exist (See Gioia and Pitre 1990; and Jackson, 1999). They criticize the separate distinction between the four research paradigms. In this regard, they highlight the difficulty of identifying a single paradigm as they can not be regarded as mutually exclusive domains. Accordingly, transition zones can be seen between the four paradigms (Gioia and Pitre 1990). Due to the blurred nature of these transition zones, it is possible to construct bridges that link apparently disparate concepts together in these zones. These transition zones constitute multiparadigm approaches. They state that "multiparadigm approaches offer the possibility of creating fresh insights because they start from different ontological and epistemological assumptions and therefore can tap different facets of organizational phenomena and can produce markedly different and uniquely informative theoretical views of events under study" (p.591).

4.5 PHILOSOPHICAL ASSUMPTIONS AND METHODOLOGICAL CHOICES UNDERPINNING THE CURRENT RESEARCH STUDY

Based on stakeholder-agency theory, the main objectives of the present study is to empirically examine the relationship between corporate governance mechanisms and the quantity and quality of corporate environmental disclosure practices in UK companies' annual reports and to provide an in-depth investigation of environmental disclosure quality identification and assessment. Firstly, the study aims at a descriptive documentation of the quantity of environmental disclosure practices as well as their association to corporate governance mechanisms, each of which is quantitatively measured, in the UK context over a period of four years. Secondly, the study aims at a descriptive documentation of the quality of environmental disclosure practices as well as their association to corporate governance mechanisms, each of which is quantitatively measured, in the UK context over a period of four years. In doing so, the study distinguishes between the different categories or areas of activity to which environmental disclosure relates as well as between the different types of environmental information content.

The current research argument is based on stakeholder-agency theory which is considered to be part of the positive accounting theory (descriptive theory), as

opposed to normative accounting theory (prescriptive theory) (Gaffikin, 2007). Positive accounting theory is also referred to as neo-empirical research, due to its reliance on empiricism or the systematic use of empirical evidence to establish theory from best practices (Henderson *et al.*, 1992). Accordingly, the study attempts to provide predictions and derive generalisable conclusions regarding corporate environmental disclosure practices and corporate governance mechanisms in the UK. In doing so, the study involves developing hypotheses and testing these hypotheses. Basically, an objective rather than a subjective truth is sought in examining the required relationship, relying mainly on measurable observations. Hence, an attempt is made to search for universal laws and regularities governing corporate environmental disclosure practices. To fulfill these research objectives, the current study adopts an objective methodological position of philosophical assumptions.

Ontologically, the current study adopts a realism position. This ontological closeness to realism is in line with neo-empirical research or positive accounting theory, which adopts a strong realist or objective position. According to the researcher, an objective reality exists, out there in a social world, independent of any human involvement and ready to be discovered and ascertained rather than subjectively constructed (Morgan and Smircich, 1980). In this regard, the current research's primary attention is given to the objective measurement of the observations comprising the phenomena under investigation; environmental disclosure and corporate governance.

Epistemologically, the study also takes a positivism position. This epistemological closeness to positivism is in line with neo-empirical research or positive accounting theory, which relies on empiricism or objective positivism. According to the researcher, knowledge of the social phenomena being studied can be obtained primarily, however not exclusively, by searching for laws, causal relationships and regularities between the constituents of the social world. Knowledge is thus seen as mainly objective to arrive at a description of reality. In this regard, the current study's knowledge about the phenomena under investigation; environmental disclosure and corporate governance, is gathered through quantitative measurement using content analysis of a sample of UK corporate annual reports.

Regarding the human nature assumptions, the current study assumes determinism. Accordingly, human beings are mainly considered as conditioned by their external

circumstances. In this regard, the current research seeks objectively measurable and observable human behaviour.

The choice of methodology is directly dependent on the ontological, epistemological and human nature assumptions of the researcher. The philosophical assumptions discussed above reveal that the current study generally follows an objective position. This implies that the study is inclined towards an objective nomothetic methodology, where quantitative research methods are made use of. Therefore, the study seeks a quantitatively measured description and exploration of the perceived reality of environmental disclosure and corporate governance.

However, when it comes to choosing the research paradigm, it follows that the transition zones that constitute multiparadigm approaches (Gioia and Pitre 1990) would be suitable for the current study. The authors argue that "multiparadigm approaches offer the possibility of creating fresh insights because they start from different ontological and epistemological assumptions and therefore can tap different facets of organizational phenomena and can produce markedly different and uniquely informative theoretical views of events under study" (p.591).

The objective of the current study is to examine the existing status of environmental disclosure practices in the annual reports of listed UK companies and to provide an in-depth investigation of environmental disclosure quality identification and assessment. Specifically, it attempts to explain the variation in the quantity and quality of current environmental disclosure practices by a number of corporate governance mechanisms. The study is not concerned with achieving fundamental change. Therefore, the transition zone linking the radical humanist and radical structuralist paradigms, that share the value for activism and change (Gioia and Pitre, 1990), would be irrelevant to the current study.

On the other hand the transition zone that links both of interpretive and functionalist paradigms provides an opportunity to benefit from the broader integrated theoretical framework; stakeholder-agency theory, adopted by the current study. Moreover, it allows for providing a descriptive analysis of environmental disclosure practices and its association to corporate governance mechanisms. Based on the above discussion, it is argued that the interpretive-functionalist transition zone is the appropriate research

paradigm to the current study. Furthermore, this paradigm fits with the objective research philosophy and methodological position adopted by the current study.

The appropriateness of a research approach "derives from the nature of the social phenomena to be explored" (Morgan and Smircich, 1980: 491). As the current study is based on the multiparadigm in the interpretive-functionalist transition zone, it doesn't aim at developing a theory but rather seeks to describe the environmental disclosure practices in UK companies' annual reports and to investigate the relationship between the quantity and quality of such disclosure and a number of corporate governance mechanisms. Therefore, the deductive approach, also referred to as the hypothetico-deductive approach, is considered to be more suitable to the present study. The hypothetico-deductive approach has been employed heavily in the disclosure literature (e.g. Haniffa and Cooke, 2005; Barako *et al.*, 2008). This approach involves five sequential stages: deducing a hypothesis from the theory; expressing the hypothesis in operational terms; testing the operational hypothesis; examining the specific outcome of the inquiry (confirming the theory or indicating the need for modification); and finally modifying the theory, if necessary (Robson, 2002; Saunders *et al.*, 2007).

Consequently, the current study is using the survey method to gather the required data. The survey technique is the research strategy usually associated with the deductive approach (Saunders *et al.*, 2007) and, hence, it aims to test a theory (Gill and Johnson, 2002). The survey technique is often used in descriptive or explanatory research, where it facilitates answering the 'what' question in the form of 'how many' or 'how much' (Yin, 2003). Surveys portray a broad picture of what several actors are reporting or thinking of (Neuman, 1997). Accordingly, they allow the collection of a considerable amount of data from a sizable population in an economical way and give the researcher more control over the research process (Saunders *et al.*, 2007). This, in turn, requires the choice of a data collection method; quantitative, qualitative or even both, to test the developed hypotheses using a highly structured methodology to facilitate replication of the findings (Gill and Johnson, 2002).

A key underlying assumption is whether quantitative or qualitative research methods would be appropriate. Jick (1979) argues that despite constituting alternative research strategies, quantitative and qualitative methods are rather seen as complementary,

with quantitative methods tending to provide breadth to the study as opposed to the depth and detail provided by qualitative methods (Patton, 2002). Accordingly, neither method is superior to the other but both are legitimate and useful for different purposes. Quantitative research considers objectivity an essential aspect of research while qualitative research acknowledges research subjectivity.

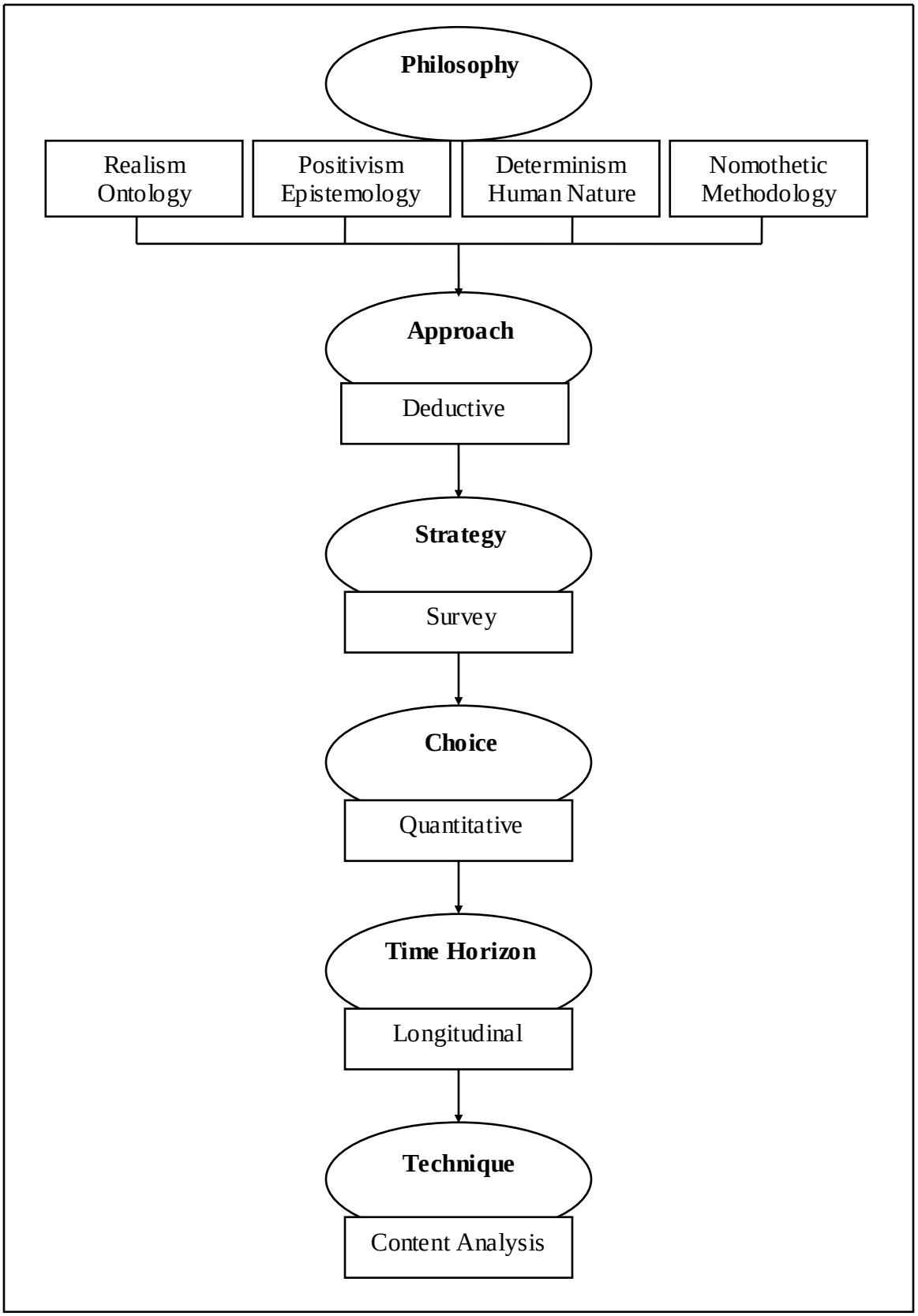
In line with the objective research philosophy and methodological position and the consequent interpretive-functionalist multiparadigm and its associated deductive approach adopted by the current study, investigating the study's research questions and, hence, achieving its objectives requires the use of objective research methods. Therefore, it is believed that quantitative research methods would be appropriate to test the developed hypotheses deduced from the stakeholder-agency theory employed by the study. Using the survey strategy and employing quantitative methods, the research seeks to gather the required data based on a longitudinal time horizon, using the research technique of content analysis.

Consequently, the current study would include two different, but complementary, quantitative empirical research analyses. The differentiation is based on the phenomenon being analyzed for achieving the research objectives. First, quantitative analysis, using content analysis of a sample of UK companies' annual reports (secondary data), will be undertaken to examine the quantity of corporate environmental disclosure practices and their association with corporate governance mechanisms, over a period of four years. Second, quantitative analysis, using content analysis of a sample of UK companies' annual reports (secondary data), will be undertaken to examine the quality of corporate environmental disclosure practices and their association with corporate governance mechanisms, over a period of four years.

Based on the above discussion of the philosophical assumptions and methodological choices, Figure 4.3 depicts the steps involved in the current research process.

Figure 4.3

The Current Research Process



4.6 QUANTITATIVE RESEARCH METHODS

It has been argued that it would be appropriate for the current study to employ quantitative research methods as fits with the objective research philosophy and methodological position adopted by the current study. Quantitative research emphasizes "the measurement and analysis of causal relationships between variables" (Denzin and Lincoln, 1994: 4), by "manipulating data through sophisticated quantitative approaches such as multivariate statistical analysis" (Morgan and Smircich, 1980: 498). Patton (2002: 14) argues that this method requires "the use of standardized measures so that the varying perspectives and experiences of people can be fit into a limited number of predetermined response categories to which numbers are assigned" and results in "a broad, generalizable set of findings".

Although quantitative research methods are considered to be fast and economical as statistics can be aggregated from large sample sizes, they are rather inflexible and artificial (Easterby-Smith *et al.*, 1991). The results of quantitative methods often reflect meanings that emerged from the beliefs and perceptions of the researcher rather than from those of the participants (Sarantakos, 1998). Moreover, the researcher does not provide effective understanding of the processes or the importance people attach to behaviour despite the wide coverage of the range of situations (Easterby-Smith *et al.*, 1991). Nevertheless, a quantitative approach enhances research reliability through greater inherent objectivity, thereby increasing the representativeness and generalisability of findings (Hussey and Hussey, 1997; Sarantakos, 1998).

In line with the objective research philosophy and methodological position and the consequent interpretive-functionalist multiparadigm and its associated deductive approach adopted by the current study, investigating the study's research questions and, hence, achieving its objectives requires the use of objective research methods. Therefore, it is believed that quantitative research methods would be appropriate to test the developed hypotheses deduced from the stakeholder-agency theory employed by the study. The quantitative methods used reflect the 'what' of the phenomenon under investigation (Yin, 2003). As the intension of this research is to gain an understanding of corporate environmental disclosure practices (What), the study was designed to include quantitative research methods.

4.7 EXAMINING THE RELATIONSHIP BETWEEN THE QUANTITY AND QUALITY OF ENVIRONMENTAL DISCLOSURE AND CORPORATE GOVERNANCE

The empirical study aims at quantitatively examining the quantity and quality of corporate environmental disclosure practices and their association with corporate governance mechanisms in the annual reports of UK listed companies. This section presents the research design employed in the conduct of the current study's quantitative analysis. The design is largely dependent upon the research's philosophical assumptions and, hence, methodological choices, which, in turn, dependent upon the research questions that need to be investigated. The section commences with the development of testable hypotheses. It then considers sample selection and time horizon, research method and instrument, definition and measurement of key variables, model specification and statistical tests used in the study.

4.7.1 Hypotheses Development

Reviewing disclosure literature, it can be observed that voluntary environmental disclosure practices are a sophisticated phenomenon that may be driven by various factors. In addition to firm characteristics, the current study examines several attributes of corporate governance and ownership structure as possible determinants of voluntary environmental disclosure. Based on prior research, the study will focus primarily on identifiable and measurable corporate governance characteristics to explain the extent to which companies disclose environmental information and the quality of such information.

In order to operationalize this objective, corporate governance mechanisms are manifested and classified into the following three groups: (1) Board Characteristics: board independence, role duality, board size, board meetings, directors' qualifications and experience including educational background, community influence and cross-directorships; (2) Board Committees Characteristics: the presence of corporate

environmental responsibility (CER) committee or responsible, audit committee independence, remuneration committee independence, nomination committee independence; and (3) Ownership Structure: ownership concentration, institutional ownership.

The key advantage to using this setting is the existence of multiple, yet complementary corporate governance mechanisms that act as monitoring mechanisms enforcing management to act in the best interest of stakeholders which, in turn, might affect the disclosure decision. Taken together, these governance mechanisms influence the emphasis placed on environmental issues and the manner in which the role of a corporation and its stakeholders are defined in a society. This, in turn, is reflected in corporate environmental disclosure practices. Following is a detailed discussion and theoretical justification underlying the choice of each corporate governance variable. From these variables, testable hypotheses are developed.

4.7.1.1 Board Characteristics

The board of directors plays an important role in corporate governance practices (Bhagat and Bolton, 2008; Haniffa and Cooke, 2002) and this role may be directly linked to companies' environmental attention (Halme and Huse, 1997). It is the board of directors that manages information disclosure in annual reports and therefore disclosure may be a function of board members (Gibbins *et al.*, 1990; Haniffa and Cooke, 2005). Accordingly, board characteristics are expected to impact environmental disclosure decisions. Board characteristics examined in the current study include board independence, role duality, board size, board meetings, directors' qualifications and experience including education, community influence and cross-directorships.

4.7.1.1.1 Board Independence

The proportion of independent non-executive directors on the board is viewed as a major factor influencing corporate voluntary disclosure in general (Barako *et al.*,

2006; Ho and Wong, 2001) and social and environmental disclosure in particular (Brammer and Pavelin, 2008; Haniffa and Cooke, 2005). Independent non-executive directors are more concerned with corporate social responsibility (Ibrahim *et al.*, 2003; Webb, 2004) and, hence, social and environmental disclosure. The focus on board independence is grounded in the agency theory and complemented by the stakeholder perspective. As representatives of stakeholders, independent non-executive directors are perceived as a tool for monitoring management behavior (Dixon *et al.*, 2005; Rosenstein and Wyatt, 1990), resulting in more information disclosure. Fama and Jensen (1983) argued that higher proportion of independent non-executive directors increases board effectiveness in monitoring managerial opportunism and, consequently, increases voluntary disclosures. In a similar vein, Forker (1992) argued that inclusion of non-executive directors on corporate boards enhances the quality of financial disclosure and reduces the benefits from withholding information. Furthermore, independent directors may show more objectivity and may consider diverse stakeholders in making their deliberations and recommendations Zahra and Pearce II (1989). Accordingly, they provide outside perspectives, including the propensity to provide transparent information to a wide range of stakeholders, to help attain the company's strategic goals (Rupley *et al.*, 2011).

However, empirical evidence on the relationship between board independence and corporate environmental disclosures is limited. Although Brammer and Pavelin (2006) were unable to confirm a significant relationship, evidence of the existence of a positive association between the proportion of independent non-executive directors and each of the quantity and quality of corporate environmental disclosures is documented by Post *et al.* (2011) and Rupley *et al.* (2011) respectively. Even the relationship between board independence and voluntary disclosure in general is mixed. While Barako *et al.* (2006) and Haniffa and Cooke (2002) found negative relationship, Huafang and Jianguo (2007), Lim *et al.* (2007) and Cheng and Courtenay (2006) documented a positive association between the proportion of independent non-executive directors and voluntary disclosure, with Ho and Wong (2001) didn't conclude a significant relationship at all.

Following the argument that independent non-executive directors provide the necessary checks and balances for enhancing board effectiveness and act as a sound

mechanism to diffuse agency conflicts between managers and owners (Fama and Jensen, 1983), they help ensure that companies are pursuing, and strongly aligned with, stakeholders' interests (Haniffa and Cooke, 2005; Zahra *et al.*, 1993). Better alignment with stakeholders' interests, which should be manifested in increased transparency, brings greater expectation of comprehensive and high-quality environmental information dissemination (Brammer and Pavelin, 2008; Cheng and Courtenay, 2006; Williamson, 1984). Hence, the following hypotheses are proposed:

H_{1a} : *There is a positive relationship between the quantity of corporate environmental disclosure and the proportion of independent non-executive directors on the board.*

H_{1b} : *The relationship between the quantity of corporate environmental disclosure and the proportion of independent non-executive directors on the board would differ among different categories of disclosure.*

H_{1c} : *There is a positive relationship between the quality of corporate environmental disclosure and the proportion of independent non-executive directors on the board.*

H_{1d} : *The relationship between the quality of corporate environmental disclosure and the proportion of independent non-executive directors on the board would differ among different categories of disclosure.*

4.7.1.1.2 Role Duality

There is widespread acknowledgement that role duality, where the chief executive officer (CEO) is also the chairman of the board, may constrain board independence and compromise its effectiveness as a governance mechanism (Adams *et al.*, 2005; Millstein, 1992). Agency theory argues for the separation of management and control and, hence, suggests that the two roles of CEO and chairman should be separated as to provide necessary checks and balances over management's performance (Fama and Jensen, 1983). Role duality may impair board effectiveness because the CEO will be able to control board meetings and select agendas and board members (Haniffa and Cooke, 2002). It can significantly hinder the boards' important function of monitoring, disciplining and compensating senior managers and enables the CEO to engage in

opportunistic behavior because of his dominance over the board (Barako *et al.*, 2006). Combining the two roles also makes it difficult for a board to replace a poorly performing CEO (Shivdasani and Zenner, 2004).

This argument can be extended to stakeholders' rights to information disclosure and, hence, is in line with stakeholder-agency theory. Board oversight and governance roles, and the consequent impairment by role duality, may also include the dissemination of corporate information to stakeholders (Gul and Leung, 2004). Placing too much power in the hands of one person entails the possibility of restricting information flow (McKendall *et al.*, 1999) and withholding unfavorable information from reaching stakeholders (Ho and Wong, 2001). Furthermore, Forker (1992) argues that a dominant personality poses a threat to monitoring quality and is detrimental to the quality of disclosure. Separating the CEO and chairman roles is, therefore, in the stakeholders' interest.

No empirical evidence to date on the relationship between corporate environmental disclosure and role duality was able to confirm a significant association between the two variables (Al Arussi *et al.*, 2009; Michelon and Parbonetti, 2010; Rupley *et al.*, 2011). The reasoning behind these results can be attributed to Fama and Jensen (1983) argument that any adverse consequences resulting from role duality can be eliminated by market discipline. However, studies examining the relationship between role duality and corporate voluntary disclosure in general produced somewhat inconsistent results. Haniffa and Cooke (2002) and Barako *et al.*, (2006) found no significant association between the two variables. But Forker (1992) asserted a negative relationship between role duality and disclosure as did Gul and Leung (2004) and Huafang and Jianguo (2007).

Based on the above argument, separating the CEO and chairman roles makes the board of directors more likely to be effective in monitoring management's performance, ensuring a high level of transparency and, therefore, reducing information asymmetry between management and stakeholders (Gul and Leung, 2004; Rupley *et al.*, 2011). Accordingly, firms with role duality are expected to be less likely associated with comprehensive and high-quality disclosure. Hence, the following hypotheses are proposed:

H_{2a} : *There is a negative relationship between the quantity of corporate environmental disclosure and role duality.*

H_{2b} : *The relationship between the quantity of corporate environmental disclosure and role duality would differ among different categories of disclosure.*

H_{2c} : *There is a negative relationship between the quality of corporate environmental disclosure and role duality.*

H_{2d} : *The relationship between the quality of corporate environmental disclosure and role duality would differ among different categories of disclosure.*

4.7.1.1.3 Board Size

The size of the board, as an important corporate governance mechanism, has been a subject of theoretical debate. According to agency theory, a larger board has greater monitoring capacities (John and Senbet, 1998; Zahra and Pearce II, 1989) and, thus, is regarded as an effective governance tool in monitoring management's performance. Large boards are more likely to have greater representation of experienced independent directors (Welford, 2007; Xie *et al.*, 2003) and, hence, are more likely to reduce management opportunism by diverting attention to corporate social and environmental responsibilities (Sun *et al.*, 2010). From a stakeholder perspective, however, it is argued that larger boards increase the diversity of board composition. A larger board size enhances a company's ability to understand and address the diversity of various stakeholder's interests (Pearce II and Zahra, 1992; Welford, 2007), which ultimately leads to greater transparency and more information disclosure (Laksmana, 2008; Williams, 2002). Moreover, it allows greater balance and, hence, enhances decision making while increasing harmony between a firm’s stakeholders (Ho and Williams, 2003). Larger boards improve information-processing capabilities and the quality of advice given to corporate management, resulting in better representation of stakeholders’ interests, as they are not susceptible to managerial domination as smaller boards (Zahra and Pearce II, 1989).

Large and diverse boards have traditionally facilitated the governance function of the board (Goodstein *et al.*, 1994). They draw from a broader range of experience and skills covering all financial, legal and industry-specific knowledge and adding to the pool of talent that governs the organization (Pearce II and Zahra, 1992; Welford, 2007; Xie *et al.*, 2003; Zahra and Pearce II, 1989). In addition, large and diverse boards help companies to secure critical resources and reduce environmental uncertainties or lack of information about the environment (Pfeffer, 1987; Pearce II and Zahra, 1992; Goodstein *et al.*, 1994), thereby enhancing corporate performance (Chaganti *et al.*, 1985; Dalton *et al.*, 1999).

Some arguments support the idea that large boards can be dysfunctional (Khanchel, 2007). Jensen (1993) suggests that board size hinders the ability of the board to pursue long-term strategic goals. Hermalin and Weisbach (2003) argue that larger boards may be plagued with agency conflicts and monitoring problems. However, this argument may be valid only for boards that are too large or excessively sized. This due to the lack of coordination associated with a large board, which slows down the decision making process and decreases board efficiency (Jensen, 1993; Lipton and Lorsch, 1992; Yermack, 1996). Nevertheless, such difficulties may be offset by increased board's monitoring capacities (John and Senbet, 1998) and ability to draw on a large diverse board. In addition, they may be partly mitigated through the use of subcommittees that may improve coordination (Goodstein *et al.*, 1994).

Empirical evidence on the relationship between board size and corporate environmental disclosures is quite limited. Although Halme and Huse (1997) and Michelon and Parbonetti (2010) were unable to confirm a significant relationship, evidence of the existence of a positive association between board size and corporate environmental disclosure is documented by Cormier *et al.* (2011). In a similar vein, Cormier *et al.* (2010) found board size to be negatively related to information asymmetry and, thus, positively related to voluntary disclosure, assuming such relationship to be an inverted "U" shape, with an optimal board size existing midway. Below this optimal board size, there is a positive relation between board size and information asymmetry followed by a negative relationship.

Based on a stakeholder-agency perspective, the current study follows the argument that a larger board promotes more effective decision making and enhances

information-processing capabilities (Ho and Williams, 2003). Greater representation of the wider interests of stakeholders by large boards indicates a higher level of environmental attention (Halme and Huse, 1997) and, hence, brings greater expectation of environmental information dissemination. Consistent with this view, it can be argued that increasing the number of directors on the board could provide better communication with diverse stakeholders through comprehensive and high-quality environmental disclosure. Accordingly, the following hypotheses are derived:

H_{3a} : *There is a positive relationship between the quantity of corporate environmental disclosure and board size.*

H_{3b} : *The relationship between the quantity of corporate environmental disclosure and board size would differ among different categories of disclosure.*

H_{3c} : *There is a positive relationship between the quality of corporate environmental disclosure and board size.*

H_{3d} : *The relationship between the quality of corporate environmental disclosure and board size would differ among different categories of disclosure.*

4.7.1.1.4 Board Meetings

Another measure of board effectiveness is the number of meetings held in a year. Meeting frequency reflects the diligence and vigilance of the board in carrying their monitoring duties (Persons, 2006). Consistent with agency theory, board meeting frequency is an element of strong corporate governance (Khanchel, 2007). If a firm is efficient in setting the frequency of its board meetings, it will attain economies in agency costs (Vafeas, 1999). In other words, board activity, as represented by meeting frequency, influences the board's ability to act as an effective monitoring mechanism in mitigating agency conflicts (Xie *et al.*, 2003). Increased monitoring is expected to result in reduced information asymmetry and lower agency costs, thereby increasing disclosures (Nelson *et al.*, 2010). Therefore, boards should increase meetings frequency if the situation requires significant supervision and control (Shivdasani and Zenner, 2004).

From a stakeholder perspective, frequent board meetings would enhance board effectiveness (Conger *et al.*, 1998) and, hence, its ability to address stakeholders interests which, in turn, may positively affect disclosure decisions. Frequent board meetings would facilitate better communication and information sharing among directors (Shivdasani and Zenner, 2004) and would allow better workload distribution and committee assignments, leading to more effective board decisions and increased transparency (Laksmana, 2008). Frequency of meetings is also argued to be associated with the quality of reporting (Laksmana, 2008). In addition, an active board that meets more often is able to devote more time to issues such as social and environmental responsibility. Therefore, board effectiveness could be compromised if the number of meetings is small. Infrequent meetings reduce the ability of boards to build their collective strength (Demb and Neubauer, 1992).

Empirical findings highlight the need for a better understanding of all elements that determine board effectiveness including board meetings (Van den Berghe and Levrau, 2004). Although not previously addressed in environmental disclosure research, Laksmana (2008) documents that a board having more time to meet leads to increased transparency. Particularly, the study provided evidence that board meeting frequency is positively associated with the extent of voluntary disclosure of compensation practices. However, Cormier *et al.* (2010) did not confirm any relationship between board meetings and voluntary corporate governance disclosure. Similarly, Nelson *et al.* (2010) found insignificant relationship between board meetings and the nature and extent of statutory executive stock option disclosures by Australian listed companies.

Based on the above argument, board meetings frequency increases board monitoring, enhances board effectiveness, promotes transparency and, in turn, reduces information asymmetry, in addition to the possibility of devoting more time to issues such as social and environmental responsibility. Consistent with this argument, boards that meet more frequently are more likely to provide enhanced environmental disclosure. The study, therefore, expects environmental disclosure to be positively related to the number of board meetings. Hence, the following hypotheses are developed:

H_{4a} : *There is a positive relationship between the quantity of corporate environmental disclosure and board meetings frequency.*

H_{4b} : *The relationship between the quantity of corporate environmental disclosure and board meetings frequency would differ among different categories of disclosure.*

H_{4c} : *There is a positive relationship between the quality of corporate environmental disclosure and the board meetings frequency.*

H_{4d} : *The relationship between the quality of corporate environmental disclosure and board meetings frequency would differ among different categories of disclosure.*

4.7.1.1.5 Directors' Qualifications and Experience

Directors' qualifications and experience, reflecting the educational background, values, skills and expertise of directors, is argued to be a major factor influencing the governance of the firm. Directors are not homogeneous in terms of specific skills, knowledge and expertise (Baysinger and Hoskisson, 1990; Kesner, 1988). Accordingly, Mallin and Michelon (2011) and Michelon and Parbonetti (2010) argue that the distinctive qualifications and experience of board members contribute differently to board functioning and priorities. From an agency perspective, board performance is of higher quality when its members have more experience (Fama 1980; Fama and Jensen 1983). As the knowledge and experience possessed by board members increases, the more likely these members will be better equipped to carry out their governance roles and help the company in meeting its strategic objectives (Peters and Romi, 2011) by providing counsel and advice to management (Zahra and Pearce II, 1989). Such relationships exist due to directors' ability to raise and interpret issues of interest to the board such as social and environmental responsibility issues and the related disclosure.

A stakeholder theory argues for the presence of experienced and well qualified independent directors on the board to ensure board effectiveness. According to Pfeffer and Salancik (1978), they represent channels for communicating information and assist in obtaining support from important stakeholders. Directors with different education, expertise and skills are more likely to resist managerial domination and represent stakeholders' interests (Zahra and Pearce II, 1989). They are more likely to

act in shareholders' best interests and understand the wider responsibilities to other stakeholders (Welford, 2007). Having directors with and with multiple perspectives covering all financial, legal and industry-specific knowledge improve the quality of decisions taken by the firm, including disclosure decisions (Welford, 2007; Zahra and Pearce II, 1989). These benefits are likely to be stronger if the board members possess environmental expertise, who can effectively evaluate environmentally innovative strategies, including the provision of enhanced environmental disclosure (Peters and Romi, 2011).

The current study argues that directors' qualifications and experience are a function of three factors, namely education, community influence, and cross-directorships of board members. In order to analyze the effect that diversity in background knowledge, skills and expertise of directors has on environmental disclosure, the study considers directors with business, accounting, and/or finance educational backgrounds; community influential directors; and directors with multiple directorships. Consistent with the above arguments, this diversity in background and expertise is likely to affect board governance roles and, ultimately, the provision of environmental accounting disclosure. Specifically, the current study examines whether the increase in the proportion of directors on the board with business, accounting, and/or finance education; community influence; and cross-directorships is associated with comprehensive and high-quality environmental disclosure. Following is a discussion of each of the elements of directors' qualifications and experience and how it is expected to enhance environmental disclosure practices, succeeded by the formulation of the relevant hypotheses.

4.7.1.1.5.1 Education

Educational background of directors can be a significant factor in determining corporate disclosure. Education can be identified as an institutional consequence influencing accounting systems and practices (Gray, 1988). An educated manager can have a broader perspective and superior pattern of thinking and, thus, is more likely understand the wider interests of various stakeholders (Akhtaruddin and Abdur Rouf, 2011; Welford, 2007). Merchant *et al.* (1995) argue that western-educated directors

may adopt innovative ideas and values that could significantly affect their disclosure behavior. Wallace and Cooke (1990) also argued that an increase in the education level may increase awareness of corporate accountability. Therefore, directors having an accounting and/or business educational background may be more likely to disclose more information to demonstrate accountability (Haniffa and Cooke, 2002). In addition, the educational background of directors can determine their approach to environmental disclosure as reactive or proactive (Peters and Romi, 2011). Accordingly, the current study argues that an increase in the proportion of directors on the board with business, accounting, and/or finance education is accompanied by enhanced environmental disclosure. Currently, no empirical evidence exists on the relationship between directors' education and a direct measure of corporate environmental disclosure. However, in the context of voluntary disclosure in general, although Haniffa and Cooke (2002) found insignificant relationship, Akhtaruddin and Abdur Rouf (2011) documented a positive association between board members qualified in business and accounting and the extent of voluntary disclosure. The current study hypothesizes that:

H_{5a} : *There is a positive relationship between the quantity of corporate environmental disclosure and the proportion of directors on the board with business, accounting, and/or finance education.*

H_{5b} : *The relationship between the quantity of corporate environmental disclosure and the proportion of directors on the board with business, accounting, and/or finance education would differ among different categories of disclosure.*

H_{5c} : *There is a positive relationship between the quality of corporate environmental disclosure and the proportion of directors on the board with business, accounting, and/or finance education.*

H_{5d} : *The relationship between the quality of corporate environmental disclosure and the proportion of directors on the board with business, accounting, and/or finance education would differ among different categories of disclosure.*

4.7.1.1.5.2 Community Influence

Community influential directors are defined as directors with experience and linkages who provide support and service to the company in terms of networking and reputation, through connections with various stakeholders, beyond the competitive environment of the firm (Hillman *et al.*, 2000; Mallin and Michelon, 2011; Michelon and Parbonetti, 2010). Specifically, they facilitate information acquisition and processing by establishing contacts with stakeholders, thereby help absorb environmental uncertainty and enhance corporate performance in general (Zahra and Pearce II, 1989) and corporate social performance in particular (Mallin and Michelon, 2011). In addition, they are "less likely to tolerate environmental irresponsibility because their interests are more closely aligned with the interests of the community at large" (Kassinis and Vafeas, 2002: 401). Examples of community influential directors are politicians, academicians, military officers, members of clergy and religious leaders, and members of social or community organizations as well as members of professional bodies and regulators (Baysinger and Zardkoohi, 1986; Hillman *et al.*, 2000) or holding a combination of any of these positions and memberships. By bringing valuable non-business perspectives, community influential directors enhance board awareness about stakeholders' needs and expectations, in addition to taking such needs and expectations into consideration while addressing disclosure decisions (Hillman *et al.*, 2000; Mallin and Michelon, 2011; Michelon and Parbonetti, 2010). This brings attention to the vital role played by community influential directors in orienting corporate disclosure towards satisfying the wider interests of stakeholders and leads to the expectation that their presence on the board might promote environmental disclosure. Accordingly, the current study argues that an increase in the proportion of community influential directors on the board is accompanied by enhanced environmental disclosure. Empirically, Michelon and Parbonetti (2010) found that the proportion of community influential directors on the board positively affects sustainability, environmental, and strategic disclosure. The current study hypothesizes that:

H_{6a} : *There is a positive relationship between the quantity of corporate environmental disclosure and the proportion of directors on the board with community influence.*

H_{6b} : *The relationship between the quantity of corporate environmental disclosure and the proportion of directors on the board with community influence would differ among different categories of disclosure.*

H_{6c} : *There is a positive relationship between the quality of corporate environmental disclosure and the proportion of directors on the board with community influence.*

H_{6d} : *The relationship between the quality of corporate environmental disclosure and the proportion directors on the board with community influence would differ among different categories of disclosure.*

4.7.1.1.5.3 Cross-Directorships

Cross-directorships is another aspect of directors' qualifications and experience that exists when directors serve on more than one board. From an agency perspective, cross-directorships are used by directors as a signal of decision expertise (Fama and Jensen, 1983). Multiple directorships enable directors to draw on their wider experience and expertise in monitoring management and improving board effectiveness (Kosnik, 1987), under the assumption that diversity in expertise can improve board monitoring, oversight and decision making (Browder, 1995; Laksmana, 2008; Useem, 1993) thereby enhancing overall corporate performance (Weir *et al.*, 2002). Consistent with a stakeholder perspective, however, cross-directorships may help directors gain the necessary skills and experience needed to understand and address the wider environmental responsibilities towards various stakeholders. Dahya *et al.* (1996) highlight the importance of multiple directorships in promoting increased information transparency as they offer insights and comparisons based on knowledge of other organizations. Consequently, Haniffa and Cooke (2002) argue that cross-directorships have important implications for disclosure practices through greater access to information. In addition, Rupley *et al.* (2011) argue that multiple directorships increase the overall quality of environmental disclosure as a result of greater exposure to other companies' environmental reporting. Accordingly, the current study argues that an increase in the proportion of directors on the board with cross-directorships is accompanied by enhanced environmental disclosure.

Empirically, Haniffa and Cooke (2005) found a positive association between cross-directorships and the extent of corporate social and environmental disclosure and Rupley *et al.* (2011) results strongly support that environmental disclosure quality is positively associated with board expertise as measured by multiple directorships. The current study hypothesizes that:

H_{7a} : *There is a positive relationship between the quantity of corporate environmental disclosure and the proportion of directors on the board with cross-directorships.*

H_{7b} : *The relationship between the quantity of corporate environmental disclosure and the proportion of directors on the board with cross-directorships would differ among different categories of disclosure.*

H_{7c} : *There is a positive relationship between the quality of corporate environmental disclosure and the proportion of directors on the board with cross-directorships.*

H_{7d} : *The relationship between the quality of corporate environmental disclosure and the proportion of directors on the board with cross-directorships would differ among different categories of disclosure.*

4.7.1.2 Board Committees Characteristics

Board effectiveness depends not only on the composition of the board as a whole, but also on the structure of its committees. Corporate governance principles recommend that boards should enhance their monitoring and control functions by forming committees that are responsible for particular duties (UK Corporate Governance Code, 2010). Kesner (1988) indicates that significant board decisions originate at the committee level. Board committees enable subgroups of directors to comprehensively consider the details of specific issues of interest that the full board would not have time to address (Lorsch and MacIver, 1989). Accordingly, board's oversight and monitoring roles are enhanced through the establishment of specialized committees (Zahra and Pearce II, 1989). Similarly, board committees are associated with improved corporate governance (Forker 1992; Davis 2001). Despite this fact,

however, there is a lack of empirical evidence on the impact of board subcommittees' structure on corporate performance – and corporate disclosure - in the UK context (Weir *et al.*, 2002). Board committees characteristics examined in the current study include the presence of corporate environmental responsibility (CER) committee or responsible, audit committee independence, remuneration committee independence and nomination committee independence.

4.7.1.2.1 Corporate Environmental Responsibility (CER) Committee Presence

The presence of a corporate environmental responsibility (CER) committee or responsible at board level may demonstrate the board's commitment towards environmentally responsible behaviour and indicate the firm's willingness to balance the often conflicting interests of stakeholder groups (Monks and Minow, 1995). Board CER committee is typically in charge of reviewing CER issues; identifying non-financial risks and monitoring risk management; establishing policies and standards; monitoring compliance with and performance against company CER policies; reviewing company reporting on CER; and overseeing philanthropic activity (Mackenzie, 2007). The presence of a CER committee should convey a message to the organization about the desirability, importance and the high priority given to environmental responsibility issues (Cowen *et al.*, 1987; McKendall *et al.*, 1999) including environmental disclosure practices (Cowen *et al.*, 1987; Rupley *et al.*, 2011).

Consistent with agency theory, CER committees will undertake more proactive environmental strategies (Peters and Romi, 2011). Social and environmental responsibility committees help companies in determining and identifying the major societal and environmental concerns that are likely to influence corporate performance (Kohls, 1986). "Failure to perform this important social responsibility role may undermine shareholders' long-term interest" (Zahra and Pearce II, 1989: 303). In addition, firms with a CER committee are more likely to disclose environmental information because the committee members will require management to demonstrate accountability by ensuring that the firm is following well-established environmental reporting guidelines and recommendations. Therefore, the presence of

such committee can be considered an effective monitoring device for enhancing environmental disclosure provided to stakeholders (Michelon and Parbonetti, 2010).

From a stakeholder perspective, however, the existence of a CER committee or a person responsible for environmental issues at the board level indicates an active strategic posture of the company with respect to stakeholders (Michelon and Parbonetti, 2010; Ullmann, 1985). As the CER committee is responsible for ensuring the quality of the company's environmental reporting policies, the establishment of such committee can be regarded as a means of addressing stakeholders' interests and responding to their expectations (Michelon and Parbonetti, 2010; Peters and Romi, 2011). Similarly, Rupley *et al.* (2011) argue that the existence of a CSR committee, which brings greater awareness of wider stakeholders' interests indicating strong board governance, is positively associated with the quality of environmental disclosure.

Empirical evidence on the relationship between the existence of corporate environmental responsibility (CER) committee on the board and environmental disclosure is quite limited. Although McKendall *et al.* (1999), Michelon and Parbonetti (2010) and Rupley *et al.* (2011) were unable to confirm a significant relationship, evidence of the existence of a positive association between the presence of a CER committee on the board and corporate environmental disclosures is documented by Peters and Romi (2011). In a similar vein, Hassan (2010) found that the presence of corporate social responsibility (CSR) committee is associated with the quantity and quality of corporate social disclosure.

In line with the above argument and consistent with a stakeholder-agency perspective, the existence of corporate environmental responsibility (CER) committee on the board acts as an effective monitoring device and a sound means of addressing broader stakeholders' interests. Accordingly, the current study argues that the presence of a board-level CER committee is associated with a greater propensity to provide enhanced environmental disclosure. Hence, the following hypotheses are formulated:

H_{8a} : *There is a positive relationship between the quantity of corporate environmental disclosure and the presence of a CER committee.*

H_{8b} : *The relationship between the quantity of corporate environmental disclosure and the presence of a CER committee would differ among different categories of disclosure.*

H_{8c} : *There is a positive relationship between the quality of corporate environmental disclosure and the presence of a CER committee.*

H_{8d} : *The relationship between the quality of corporate environmental disclosure and the presence of a CER committee would differ among different categories of disclosure.*

4.7.1.2.2 Audit Committee Independence

The presence of an audit committee on the board represents an additional internal governance mechanism that is expected to improve the company's performance (Weir *et al.*, 2002). Audit committees are defined as being "responsible for overseeing the financial reporting process and ensuring the objectivity of the external audit" (Uzun *et al.*, 2004: 36). More importantly, independence of the audit committee members can significantly contribute to the committee's effectiveness (Xie *et al.*, 2003), as it enables the committee to carry out its responsibilities objectively (Abbott *et al.*, 2004). An effective audit committee helps the board to meet its statutory and fiduciary responsibilities (Weir *et al.*, 2002). From a stakeholder-agency perspective, it is argued that audit committees act as monitoring mechanisms that improve the audit attestation function of corporate financial reporting (Bradbury, 1990), reducing agency costs (Ho and Wong, 2001) and hence enhancing the quality of such reporting (Bradbury *et al.*, 2006; Collier, 1993; Cotter and Silvester, 2003; Nelson *et al.*, 2010). Accordingly, audit committees can improve the quality of information flow between managers and shareholders (Barako *et al.*, 2006). Audit committees are, therefore, expected to improve the credibility of information disclosed (McMullen, 1996), thereby safeguarding stakeholders' interests. Furthermore, Forker (1992) argued that audit committees with independent directors may improve internal control and, thus, disclosure quality.

No empirical evidence to date exists on the relationship between audit committee independence and corporate environmental disclosure. However, in the context of voluntary disclosure in general, a positive association exists between the presence of an audit committee and voluntary disclosure practices as documented by Ho and Wong (2001) and Barako *et al.* (2006). Similarly, O'Sullivan *et al.* (2008) found that the existence of an audit committee and its independence are positively associated with voluntary disclosure of forward-looking information. Yet, examining statutory executive stock option disclosures, Nelson *et al.* (2010) found that audit committee independence contributes to improved disclosures by Australian listed companies.

The insight in these studies is that independent directors on audit committees are important in handling agency problems and managing broader stakeholders' interests, which, in turn, improves disclosure practices. Following this line of thinking, and taking into consideration that the audit function may comprise environmental audit in addition to the financial one, it can be argued that the independence of board-level audit committee is expected to enhance environmental disclosure. Hence, the following hypotheses are proposed:

H_{9a} : *There is a positive relationship between the quantity of corporate environmental disclosure and audit committee independence.*

H_{9b} : *The relationship between the quantity of corporate environmental disclosure and audit committee independence would differ among different categories of disclosure.*

H_{9c} : *There is a positive relationship between the quality of corporate environmental disclosure and audit committee independence.*

H_{9d} : *The relationship between the quality of corporate environmental disclosure and audit committee independence would differ among different categories of disclosure.*

4.7.1.2.3 Remuneration Committee Independence

UK Corporate Governance Code (2010) recommends that companies should establish board committees, which act as monitoring mechanisms, thereby enhancing corporate governance. A remuneration committee, also called compensation committee, is responsible to the board for assessing management's performance and recommending appropriate remuneration packages of directors (Nelson *et al.*, 2010; Uzun *et al.*, 2004). Without such committee, directors will award themselves excessive remuneration which, being unrelated to performance, would be detrimental to firm value (Bruce and Buck, 2005). From an agency perspective, independent remuneration committees can help alleviate agency problems by constructing and implementing incentive schemes designed to align the goals of senior management with those of shareholders (Uzun *et al.*, 2004). From a stakeholder perspective, however, it is argued that independent remuneration committees are likely to make objective decisions by supporting greater disclosure (Laksmana, 2008). A more independent remuneration committee is less aligned to management and hence, is more likely to encourage more transparent disclosures (Nelson *et al.*, 2010).

Similarly, Main and Johnson (1993) argue that the existence of a remuneration committee should ensure that remuneration is closely related to performance. This argument is particularly valid given the independence of the committee members. Empirical evidence addressing this issue indicated strong performance-pay link (Daily *et al.*, 2003; Jensen and Murphy, 1990; Main *et al.*, 1996). Furthermore, a company's executive pay policy includes "providing effective reward and incentive to existing staff, supporting their retention, and attracting new talent by providing the company with a positive profile in executive labor markets" (Bruce and Buck, 2005: 119). These functions suggest that managers will act in the best interests of stakeholders in order to receive considerable pay and retain their position in the firm. Therefore, the independence of a remuneration committee helps to mitigate agency problems and to ensure better alignment to stakeholders' interests, which in turn improves corporate disclosure.

No empirical evidence to date exists on the relationship between remuneration committee independence and corporate environmental disclosure. However, in the context of voluntary disclosure in general, Laksmana (2008) found that compensation

committees with the authority to exercise independent oversight of management provide more voluntary disclosure of executive compensation practices. Similarly, O'Sullivan *et al.* (2008) found that the presence of a remuneration committee and its independence are positively associated with voluntary disclosure of forward-looking information. Yet, examining statutory executive stock option disclosures, Nelson *et al.* (2010) found that compensation committee independence contributes to improved disclosures by Australian listed companies.

Based on the above argument, the independence of the remuneration committee members is a necessary requirement for handling agency problems and managing broader stakeholders' interests. Increased monitoring of management and better alignment with stakeholders' interests is expected to result in reduced information asymmetry and lower agency costs, thereby increasing disclosures (Nelson *et al.*, 2010). Following this line of reasoning, and taking into consideration that remuneration setting links pay to performance including environmental performance, it can be argued that the independence of board-level remuneration committee is expected to enhance environmental disclosure. Hence, the following hypotheses are proposed:

H_{10a} : *There is a positive relationship between the quantity of corporate environmental disclosure and remuneration committee independence.*

H_{10b} : *The relationship between the quantity of corporate environmental disclosure and remuneration committee independence would differ among different categories of disclosure.*

H_{10c} : *There is a positive relationship between the quality of corporate environmental disclosure and remuneration committee independence.*

H_{10d} : *The relationship between the quality of corporate environmental disclosure and remuneration committee independence would differ among different categories of disclosure.*

4.7.1.2.4 Nomination Committee Independence

Enhancing corporate governance can be accomplished through the existence of board committees acting as monitoring mechanisms as recommended by the principles of UK Corporate Governance Code (2010). These principles also recognize that effective monitoring requires that committees be independent of management. A nomination committee is suggested as a way to help ensure a formal and transparent procedure for the appointment of new directors to the board. In doing so, nomination committees review gathered information to enable the assessment and selection of candidates for nomination to membership on the board (Carson, 2002; Uzun *et al.*, 2004). The authors also argue that nomination committees "are central to the effective functioning of the board over time" (Uzun *et al.*, 2004: 36-37). Without a nomination committee, firms tend to appoint fewer independent directors and more gray directors, who are not truly independent, giving rise to conflicts of interest (Shivdasani and Yermack, 1999). Board nomination committees have grown in number and power sufficiently well to exert influence in the nomination and selection of directors (Kesner, 1988). The presence of such monitoring committees as nomination committees is found to be positively related to factors associated with the benefits of monitoring (John and Senbet, 1998), particularly given their independence. Accordingly, consistent with stakeholder-agency theory, nomination committee independence helps to resolve agency conflicts and align to stakeholders' interests.

Currently, no empirical evidence exists on the relationship between nomination committee independence and corporate environmental disclosure. Nevertheless, in the context of voluntary disclosure in general, Cheung *et al.* (2010) found that companies with board-level committees including a nomination committee tend to more transparent and O'Sullivan *et al.* (2008) found that the presence of a nomination committee is positively associated with voluntary disclosure of forward-looking information. These results should encourage nomination committees to reflect carefully on possible representation of independent directors.

Consistent with the above argument, the independence of nomination committee members results in increased monitoring and accountability to stakeholders, thus promoting greater reporting transparency (Carson, 2002; O'Sullivan *et al.*, 2008) Following this line of thinking, and taking into consideration the wider stakeholders'

interests in environmental information, it can be argued that the independence of board-level nomination committee is expected to enhance environmental disclosure. Hence, the following hypotheses are proposed:

H_{11a} : *There is a positive relationship between the quantity of corporate environmental disclosure and nomination committee independence.*

H_{11b} : *The relationship between the quantity of corporate environmental disclosure and nomination committee independence would differ among different categories of disclosure.*

H_{11c} : *There is a positive relationship between the quality of corporate environmental disclosure and nomination committee independence.*

H_{11d} : *The relationship between the quality of corporate environmental disclosure and nomination committee independence would differ among different categories of disclosure.*

4.7.1.3 Ownership Structure

Concentration and type of ownership have been suggested as significant factors in explaining variability in voluntary disclosure practices. Variations in ownership structures may affect the relationship between a company and its stakeholders and influence the level and quality of corporate social and environmental disclosure (van der Laan Smith *et al.*, 2005), as determined by the level of monitoring managerial behaviour (Eng and Mak, 2003). In this regard, "the relative power between managers and shareholders will then determine the dominating values" (Halme and Huse, 1997: 141). Ownership Structures examined in the current study include ownership concentration and institutional ownership.

4.7.1.3.1 Ownership Concentration

Agency theory suggests that agency conflicts resulting from the separation of ownership and control (Jensen and Meckling, 1976) are greater when shares are widely held (ownership dispersion) than when they are closely held (ownership concentration) (Fama and Jensen, 1983). To mitigate the severity of conflicts associated with ownership dispersion, mangers may be willing to voluntarily disclose more information, as small owners rely upon such disclosures for information concerning the firm's activities (Brammer and Pavelin, 2008). Thus, voluntary disclosure can be viewed as a means by which managers demonstrate that they act in the best interests of the owners (Craswell and Taylor, 1992). In case of ownership dispersion, shareholders have little direct authority over managers and hence inability to effectively monitor management and a consequent degree of information asymmetry (Brammer and Pavelin, 2006). This situation, which brings an adverse investor reaction, provides an incentive for a firm to disclose environmental information to shareholders (Brammer and Pavelin, 2006; Ullmann, 1985).

Alternatively, ownership concentration, which is associated with less agency conflicts, decreases the likelihood of voluntary disclosure. In addition, substantial shareholders may represent a key stakeholder group who have power (O'Sullivan *et al*., 2008) and therefore can obtain the required information from alternative sources other than corporate disclosure (Berthelot *et al*., 2003). Similarly, Cormier *et al*. (2005) argue that closely-held ownership is not expected to be responsive to public disclosure since the dominant shareholders typically have access to the information they need. Furthermore, Reverte (2009) argues that companies with diffused ownership are more likely to improve their financial reporting policy by providing corporate social and environmental disclosure, while companies with concentrated ownership are less motivated to disclose additional information on their social and environmental performance.

A stakeholder perspective, however, suggests that when a company is widely held the issue of accountability becomes important as there is a greater likelihood that the shares of these companies are being held by a wide variety of stakeholders (Ghazali, 2007). Greater accountability brings the need for additional information to voluntarily disclose social and environmental performance to inform stakeholders about the

extent to which managers' responsibility have been fulfilled (Ghazali, 2007; Gray *et al.*, 1991). Hence, in case of ownership dispersion, higher accountability of top management turns into an increasing level of stakeholders' environmental information satisfaction.

Empirical evidence of the relationship between ownership concentration and corporate environmental disclosure is quite limited, yet, consistent. Ownership concentration has been found to be statistically significant and negatively associated with environmental disclosure in annual reports as documented by Brammer and Pavelin (2006) as to the quantity of such disclosure and by Brammer and Pavelin (2008) and Cormier *et al.* (2005) as to the quality of such disclosure. Both Reverte (2009) and Prado-Lorenzo *et al.* (2009) found ownership concentration to have negative relationship to corporate social responsibility disclosure, although the latter revealed only limited association. However, in the context of voluntary disclosure, evidence of such relationship is mixed. Haniffa and Cooke (2002) found a positive relationship between ownership concentration and voluntary disclosure while Barako *et al.* (2006) found a negative relationship with concentration as measured by the proportion owned by the top 20 shareholders.

Based on the above arguments, a dispersed ownership is associated with increased monitoring and oversight of management's behavior and higher accountability towards stakeholders that is manifested in increased dissemination of environmental information. Following these arguments, it may be expected that ownership concentration decreases the likelihood of providing enhanced corporate environmental disclosure. Hence, the following alternative hypotheses are tested:

H_{12a} : *There is a negative relationship between the quantity of corporate environmental disclosure and ownership concentration.*

H_{12b} : *The relationship between the quantity of corporate environmental disclosure and ownership concentration would differ among different categories of disclosure.*

H_{12c} : *There is a negative relationship between the quality of corporate environmental disclosure and ownership concentration.*

H_{12d} : *The relationship between the quality of corporate environmental disclosure and ownership concentration would differ among different categories of disclosure.*

4.7.1.3.2 Institutional Ownership

Concerning the type of ownership, it can be argued that different shareholders may demand different disclosures. A substantial fund in the UK capital market comes from institutional investors such as pension funds, mutual funds, banks and insurance companies, owning around 80 per cent of the UK stock market (Mallin *et al.*, 2005). Consistent with agency theory, institutional investors have strong incentives to monitor corporate disclosure practices and influence corporate values due to their large ownership stake (Barako *et al.*, 2006). In addition, it is generally argued that institutional investors are more sophisticated, powerful and have more technical expertise to monitor managers effectively (Guan *et al.*, 2007). For instance, institutional shareholders can use management's requirement for further financing to impose their own interests, through their monitoring role in the process of raising equity capital (Hillier and McColgan, 2006). Furthermore, institutional shareholders have been under increasing pressure to use their voting power to encourage good governance practices in their investee companies (UK Corporate Governance Code, 2010). Thus, managers may voluntarily disclose information to meet the expectations of large shareholders (Carson and Simnett, 1997) and their requests for comprehensive and reliable disclosures.

Furthermore, it is argued that institutional shareholders are active owners who have strategic and other long-term objectives for their investment apart from short-term financial returns (Anderson *et al.*, 2003; Monks and Minow, 1995; Welford, 2007). Consequently, they may consider environmental issues to be important as a means of long-term value creation (Halme and Huse, 1997; Prado-Lorenzo *et al.*, 2009; Welford, 2007). In line with stakeholder theory, institutional investors are "demanding more transparency and accountability and are increasingly making good corporate governance part of their investment criteria" (Welford, 2007: 49-50). Empirically, Emerson *et al.* (2005) document that long-term investors consider such factors as environmental growth potential, climate change, environmental liabilities,

and environmental operating license in their investments appraisal. However, in the absence of environmental reporting standards, long-term investors depend on corporate disclosures of voluntary environmental information (Rupley *et al.*, 2011). Accordingly, the authors argue that institutional long-horizon shareholders are positively associated with the quality of voluntary environmental disclosures.

No empirical evidence, if any, to date has confirmed the relationship between the percentage of institutional ownership and corporate environmental disclosure. Rupley *et al.* (2011) found no evidence of a relation between institutional shareholders and any of the measures of voluntary environmental disclosures. However, in the context of voluntary disclosure, institutional ownership was found to be positively associated with voluntary disclosure practices in the annual reports of Kenyan companies (Barako *et al.*, 2006).

Based on the above arguments about the monitoring potential of institutional shareholders and their demand for environmental information transparency, it can be expected that institutional shareholdings increase the likelihood of providing enhanced corporate environmental disclosure. Hence, the following hypotheses are proposed:

H_{13a} : *There is a positive relationship between the quantity of corporate environmental disclosure and institutional ownership.*

H_{13b} : *The relationship between the quantity of corporate environmental disclosure and institutional ownership would differ among different categories of disclosure.*

H_{13c} : *There is a positive relationship between the quality of corporate environmental disclosure and institutional ownership.*

H_{13d} : *The relationship between the quality of corporate environmental disclosure and institutional ownership would differ among different categories of disclosure.*

4.7.2 Sample Selection

The starting point of the sample selected for the present study is the FTSE All-Share Index. The FTSE All-Share index is the broadest index of UK listed companies, representing over 98% of the UK market capitalization (Brammer and Pavelin, 2006). An important justification for choosing these companies is that they cover a broad range of business activities and account for almost all of the UK economic output. The use of a large and industrially diverse sample permits a more comprehensive exploration and analysis of the relationship in question (Brammer and Pavelin, 2006). In addition, the inclusion of both high-profile and low-profile companies representing several industries with different degrees of environmental sensitivity potentially allows greater generaliziability of the results.

The study sets out to define its sample both in longitudinal and cross-sectional perspectives. Therefore, the annual reports of the sample companies are examined from 2004 till 2007 inclusive; a period of four years, that have witnessed an increasing awareness of corporate governance and transparency, using up to date data; the most recent data at the time of conducting the study. An important motivation for choosing this time horizon is the emergence of recent corporate reform demanding a richer disclosure environment and stronger corporate governance practices. Specifically, the selected time frame preceded a number of major corporate scandals that rocked international businesses throughout 2001-2003 and the subsequent corporate collapses. These incidents were followed by the issuance of the Combined Code of corporate governance in 2003, the first UK corporate governance code that involved government intervention as opposed to previously self-regulation initiatives. It was amended in 2006, 2008, and 2010; the current version of which is referred to as the UK Corporate Governance Code (2010). Moreover, the study's time horizon is synchronized with key changes to disclosure regulations in the Companies Act (2006) which may have impacted corporate environmental disclosure practices. This is in addition to the primary reasoning behind using time series data; that is investigating whether environmental disclosure practices and the different related disclosure categories differ over years. Furthermore, an extended time frame helps determining the significant variables that explain the variation in the extent and quality of environmental disclosure and its components among the investigated companies.

At the date of the study, 2007, the FTSE All-Share index comprised approximately of 700 companies. They are drawn from a wide spectrum of business activities. Firms belonging to the financial sector, including banks, insurance companies, investment trusts, unit trusts and real estate companies, are excluded from the sample because they are subject to different disclosure and statutory requirements that may significantly affect their accounting policies, disclosure decisions and corporate governance structures. In addition, firms with unpublished annual reports and/or missing data on *DataStream* and elsewhere (e.g. as a result of deletions caused by subsequent mergers) are deleted to assure comparability of the results. This procedure leaves a final sample of 229 attainable companies, for which complete data were readily available across all years of the sampling period. Therefore the study, covering a period of four years, is based on a comprehensive sample companies of drawn from 15 different industries and 33 industrial sectors, resulting in a total of 916 firm-year observations. A list of the sample companies included in the current study, along with the industrial sectors to which they belong, is shown in Appendix A.

Sample companies are active in sixteen major industries: Aerospace industry, Agriculture industry, Chemical industry, Computer industry, Construction industry Defense industry, Energy industry, Entertainment industry, Food industry, Hospitality industry, Information industry, Manufacturing industry, Mass media industry, Telecommunications industry, and Water industry. Table 4.1 shows the selection procedures of sample companies, while industrial sectors represented in the sample are shown in Table 4.2.

Table 4.1

Selection Procedures of Sample Companies

UK Listed Companies	Number of Companies
FTSE All-Share index companies	691
(-) Financial companies	232
(-) Companies with missing annual reports	121
(-) Companies with missing data	109
Sample companies	229

Table 4.2

Industrial Sector Representation of Sample Companies

Sector	Number of sample companies	Sector Percentage of sample companies
Aerospace & Defence	7	3.06
Airlines & Airports	1	0.44
Automobiles & Parts	2	0.87
Beverages	3	1.31
Chemicals	6	2.62
Computer Software & Services	15	6.55
Construction & Building Materials	12	5.24
Diversified Industrials	1	0.44
Electricity	4	1.75
Electronic & Electrical Equipment	10	4.37
Engineering & Machinery	11	4.80
Food & Drug Retailers	4	1.75
Food Producers & Processors	8	3.49
Forestry & Paper	1	0.44
Gas Distribution	1	0.44
General Retailers	17	7.42
Health	3	1.31
Housing Goods & Textiles	3	1.31
Information Technology Hardware	6	2.62
Leisure Entertainment & Hotels	5	2.18
Media & Photography	18	7.86
Mining	5	2.18
Oil & Gas	9	3.93
Packaging	3	1.31
Personal Care & Household Products	3	1.31
Pharmaceuticals	9	3.93
Restaurants Pubs & Breweries	5	2.18
Support Services	34	14.85
Telecommunications Services	5	2.18
Tobacco	2	0.87
Transport	5	2.18
Travel & Leisure	7	3.06
Water	4	1.75
Total	229	100

4.7.3 Research Method And Instrument

The dependent variables, corporate environmental disclosure quantity and quality, are measured using content analysis of annual reports of UK listed companies. A disclosure index is developed for each of the dependent variables to help measure the quantity and quality of environmental disclosure. Three procedures are undertaken in order to develop the disclosure indices. First, a checklist or scoring sheet of environmental disclosure items is constructed as a measuring instrument by selecting the relevant informational items to be included in the checklist. Second, a coding process is carried out to assign each environmental informational item in the annual report to one of the checklist items using predetermined decision rules. Third, quantity and quality scores are calculated for each disclosure category as well as for total environmental disclosure, from which disclosure indices are computed to permit further analysis. Through these procedures, both the validity and reliability of the disclosure measurement need to be ascertained.

4.7.3.1 Content Analysis

Content analysis is a research method that has been widely used in conducting research in different areas of social sciences for many years (Krippendorff 1980). In an accounting disclosure context, content analysis has been extensively used in examining corporate social and environmental disclosure practices (see Abbott and Monsen, 1979; Campbell, 2004; Cormier *et al.*, 2005; Deegan and Gordon, 1996; Gray *et al.*, 1995a; Guthrie and Mathews, 1985; Hackston and Milne, 1996; Haniffa and Cooke, 2005; Magness, 2006; Rupley *et al.*, 2011). Content analysis can be simply defined as "a research technique for making replicable and valid inferences from data according to their context" (Krippendorff, 1980: 21). Abbott and Monsen (1979: 504) also define content analysis as "a technique for gathering data that consists of codifying qualitative information in anecdotal and literary form into categories in order to derive quantitative scales of varying levels of complexity".

The main advantages of content analysis method relate to reliability, systematicity, objectivity, external validity and volume of data. A distinguishing characteristic of

content analysis is that data are coded and measured in a reliable and systematic manner (Krippendorff, 1980). Data collected using content analysis are considered quantitative in nature due to the requirement that systematic counting procedures be followed, which deems the method more objective (Marshall and Rossman, 1999). The quantity of disclosure is an indicative of the importance that is placed on the item being disclosed by the reporting company (Campbell, 2003; Krippendorff, 1980; Unerman, 2000). External validity of content analysis is enhanced as the act of measurement does not interfere with the behaviour of the phenomenon being measured (Krippendorff, 1980). In addition, content analysis can cope with, and hence permits the analysis of, large volumes of data as those comprised within annual reports (Krippendorff, 1980).

Generally, content analysis is concerned with both the quantitative and qualitative aspects of disclosures (Monteiro and Aibar-Guzmán, 2010). Environmental disclosure content analysis involves the construction of a classification scheme and establishing a set of decision rules for coding, measuring and recording the data being examined (Milne and Adler, 1999). Specifically, content analysis method requires answering questions of where? (determining the documents used in analysis, i.e. annual reports); what? (defining environmental disclosure and its categories i.e. checklist); and how? (processing or codifying the data and calculating scores, i.e. coding process and disclosure index). Following is a detailed answer to each of the above questions.

4.7.3.2 Annual Reports

The annual report is a formal document published by companies and is used as a communication media or sampling unit. Krippendorff (1980: 57) defines sampling units as "those parts of observed reality or of the stream of source language expressions that are regarded independent of each other". The vast majority of social and environmental disclosure literature used the annual report as the primary source of corporate disclosure. The annual report is a secondary data source (Hussey and Hussey, 1997) that is employed in the current study to examine the environmental disclosure practices of UK companies over a period of four years; 2004 till 2007 inclusive.

Various justifications have been put forward throughout the disclosure literature for the extensive focus on annual reports. Annual reports are the most important media through which an organisation reveals corporate information to the public (Adams *et al.*, 1998; Botosan, 1997; Hines, 1988) and a main channel of corporate communication of social and environmental information (Gibson and O'Donovan, 2007; Gray *et al.*, 1995b; van der Laan Smith *et al.*, 2005; Wiseman, 1982). In addition, annual reports are characterized by their high degree of credibility (Neu *et al.*, 1998; Tilt, 1994), availability, accessibility and wide distribution (Campbell, 2000; Tilt, 1994; Wilmshurst and Frost, 2000; Unerman, 2000), formality and statutory nature (Buhr, 1998; Hackston and Milne, 1996; Hines, 1988; Wilmshurst and Frost, 2000), consistency (Tilt, 1994) as well as usefulness to various stakeholders (Buhr, 1998; Deegan and Rankin, 1997; Neu *et al.*, 1998; Tilt, 1994).

In addition, the presentation of financial information and social and environmental information within the same report is an important element in demonstrating how the company reconciles possible conflict between the financial and social objectives and interests of different stakeholders (Gray, *et al.*, 1995b). Halme and Huse (1997) argue that annual reports are likely to reflect corporate environmental concerns by addressing environmental issues and interests of various stakeholders. In this regard, using annual reports as a channel of communication with stakeholders is consistent with the principles of stakeholder theory (van der Laan Smith *et al.*, 2005). Accordingly, and in line with the above arguments and disclosure literature, the annual report would be used by the current study as the most reliable source for corporate environmental information.

Moreover, it is virtually impossible to monitor all available communication media of corporate social and environmental disclosure over a number of years (Gray *et al.*, 1995b). Complete and consistent identification of all these corporate communication forms of disclosure over a long period of time is likely to be problematic (Hammond and Miles, 2004; Unerman, 2000). Accordingly, Unerman (2000) argues that even though several disclosure media are available, a limit must be put on the range of documents to be examined in any particular research in order to ensure completeness and consistency of data Investigation and analysis of all possible corporate

environmental disclosure media prove to be pragmatically, financially and technically infeasible (Hanafi, 2006).

4.7.3.3 Checklist

Conducting content analysis research requires a clear and accurate definition of the phenomena under investigation. This necessitates specific identification of the main categories of environmental disclosure along with the relevant informational items within each of these categories, all of which being incorporated in what is called a checklist. Disclosure checklists are extensive lists of selected items which may be disclosed in company reports. A checklist of environmental disclosure items listed by disclosure category is constructed to capture corporate environmental disclosure practices in annual reports. The checklist is composed of different sections showing the different categories or areas to which each environmental disclosure information belongs.

As a starting point, a preliminary checklist that contains the expected environmental information items is prepared based on prior studies that have extensively examined environmental disclosure practices (e.g. Burritt, 1997; Clarkson *et al.*, 2008; Cormier and Magnan, 2003; Cormier *et al.*, 2011; Cormier *et al.*, 2005; Gray *et al.*, 1995b; Hackston and Milne, 1996; Wiseman, 1982). The checklist is then adjusted to fit with the best practices as identified by the guidelines and recommendations of the Global Reporting Initiative (GRI, 2006). However, the GRI provides relatively general guidelines rather than specific measures of environmental performance. Accordingly, in designing the checklist, an attempt has been made to identify operational measures of GRI guidelines that help capturing environmental disclosures in annual reports.

The checklist was also updated following a pilot study of annual reports of 50 randomly selected companies from different industrial sectors in the sample population for the year 2007. The sample annual reports were content analyzed to get grasp of what themes or categories are common in UK annual reports, given the different contexts involved in constructing the research instrument or the checklist; including UK, New Zealand, US, Canada, Germany, and France, although each of

which is a Western context. The results of the pilot study revealed that the checklist developed is applicable to the UK context as almost all of the environmental themes in annual reports fell within one of the categories already established. However, there are few information items among the GRI guidelines that rarely, if ever, disclosed by companies, which can be regarded as inapplicable items. Inapplicable items are excluded from the analysis as companies should not be penalized for non-disclosure of these items (Chau, and Gray, 2002; Cooke, 1989). Examples of such disclosures include information about linking executive compensation to environmental performance and adoption of GRI reporting guidelines.

In this regard, content validity of the research instrument is achieved through careful definition of the research phenomena under investigation; corporate environmental disclosure practices in UK listed companies. In addition to the extensive review of environmental disclosure literature and reporting guidelines, content validity is also attested through the use of a panel of expert judges. Three UK academics have been asked to refine the preliminary checklist, one of them has considerable practical accounting and auditing experience with UK listed companies. The reliability of the checklist is enhanced through the use of well-established decision rules, based on those rules developed by the UK Center of Social and Environmental Research (CSEAR) and guidelines on performance indicators developed by the Global Reporting Initiative (GRI, 2006). The reliability and validity of the research instrument will be presented in detail in sections 4.7.3.4.3 and 4.7.3.5.3 respectively.

Accordingly, the resulting checklist is deemed rigorous and viable in capturing environmental disclosure practices in UK companies' annual reports. The final checklist consists of 34 environmental information items distributed over six broadly defined categories. The six corporate environmental disclosure categories identified include: (1) Environmental Policies (12 items); (2) Product and Process-Related Environmental Issues (8 items); (3) Compliance with Environmental Laws and Standards (4 items); (4) Environmental Auditing (1 item); (5) Sustainability (2 items); and (6) Other Environmentally-Related Information (7 items). Each of these six categories or themes is further subdivided into a set of distinctive informational items or topics. Table 4.3 shows the checklist comprising the different environmental disclosure categories and items.

Table 4.3

Corporate Environmental Disclosure Checklist

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(1) Environmental Policies [a, b, c, d, e]

- Actual statement of environmental policies;
- Departments or positions for environmental and/or safety management;
- Past, current or future estimates of capital and operating expenditures for environmental protection or remediation;
- Environmental investment and investment appraisal;
- Financing for pollution control equipment and facilities;
- Research and development expenditures for pollution abatement;
- Environmental impact studies;
- Environmental contingent liabilities and provisions;
- Conservation of natural resources;
- Energy saving and conservation;
- Health and safety policies;
- Aesthetics policies and landscaping.

(2) Product and Process-Related Environmental Issues [a, b, c, d]

- Pollution emissions and effluent discharges;
- Waste;
- Packaging;
- Recycling;
- Products and product development;
- Efficient use of materials in the manufacturing process;
- Energy efficiency of products;
- Product safety.

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[a] adapted from Burritt (1997)

[b] adapted from Clarkson *et al*. (2008)

[c] adapted from Gray, *et al*. (1995b).

[d] adapted from Hackston and Milne (1996).

[e] adapted from Wiseman (1982).

(3) Compliance with Environmental Laws and Standards [a, b, d, e]

- Discussion of environmental regulations and requirements;
- Compliance with pollution laws and regulations;
- Compliance with health and safety standards and regulations;
- Compliance status with environmental and/or health and safety standards such as ISO, EMAS, BS OHSAS and PAS.

(4) Environmental Auditing [a, b, c]

- Internal and/or external verification, review, scoping, audit and assessment of environmental performance and/or environmental disclosure.

(5) Sustainability [a, b, c]

- Any mention of sustainability;
- Any mention of sustainable development.

(6) Other Environmentally-Related Information [a, b, c, d, e]

- Receiving awards for environmental protection or safety excellence;
- Environmental protection e.g. pest control;
- Wildlife conservation;
- Supporting anti-litter campaigns;
- Environmental education and training;
- Environmental actions/lawsuits against the company;
- Any environmental issues other than the above.

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[a] adapted from Burritt (1997)

[b] adapted from Clarkson *et al*. (2008)

[c] adapted from Gray, *et al*. (1995b).

[d] adapted from Hackston and Milne (1996).

[e] adapted from Wiseman (1982).

4.7.3.4 Coding Process And Decision Rules

A coding process is carried out to assign each environmental information item in the annual report to one of the checklist items using predetermined decision rules. Coding decisions are concerned with capturing and identifying information themes or items from a disclosure source, while measuring or counting decisions are concerned with assigning value to such themes or items once they have been coded for meaning (Campbell *et al.*, 2006; Milne and Adler, 1999). Decision rules for environmental disclosure categories and items are based on those rules developed by the UK Center of Social and Environmental Research (CSEAR) and guidelines on performance indicators developed by the Global Reporting Initiative (GRI, 2006). Decision rules are established to define which environmental information item is to be disclosed under which category or theme, thereby facilitating the coding process. Well-established decision rules and procedures enhance the objectivity and reliability of the research instrument used and, therefore, allow replication by other researchers (Krippendorff, 1980). Detailed presentation of the decision rules for coding each of environmental disclosure quantity and quality are shown in Appendix B and Appendix C respectively.

The content analysis literature reflects a debate on how best to capture the content of environmental disclosure (Campbell *et al.*, 2006). Two commonly suggested approaches are employed in the literature; either the number or frequency of environmental disclosures (see Cowen *et al.*, 1987; Ness and Mirza, 1991) or the amount or volume of disclosures (Gray *et al.*, 1995b). The current study adopts the second approach that is argued to arrive into richer data set (Gray *et al.*, 1995b). Measurement of disclosure volume can technically be undertaken using one of two methods: a measuring unit or a scoring system (Al-Tuwaijri *et al.*, 2004). Disclosure volume is measured using different units, such as number of words (see Campbell, 2004; Deegan and Gordon, 1996; Deegan and Rankin, 1996; Wilmshurt and Frost, 2000), sentences (see Hackston and Milne, 1996; Milne and Adler, 1999; Wiseman, 1982) or page proportions (see Gray *et al.*, 1995a; Guthrie and Parker, 1990; Patten, 1991).

However, the type of content analysis employed in the current study is a scoring system, where a coding scale is used to categorize disclosure based on specific items

of information found in the reports. This method better suits the purposes of the study than mere counting of words, sentences, or page proportions, which are alternative means to quantify the extent of disclosure. The counting of specific items of information is concerned with categorizing and counting the information itself rather than the format in which the information is presented or delivered (Buhr and Freedman, 2001). In addition, counting of words, sentences, or page proportion are not able to effectively capture non-narrative disclosures such as pictures, photographs, charts and graphical representations (McMurtrie, 2005). These pictorial, graphical, tabular or other non-narrative disclosure forms are such potentially effective communication tools (Beattie and Jones, 1992) that excluding them may limit the total volume and quality of disclosed information (Unerman, 2000).

Moreover, in order to specifically examine corporate environmental reporting from a corporate governance perspective, however, it would not be enough just to see how much dimensional space devoted by companies to environmental information but rather how much specific environmental information disclosed by companies. The use of a coding scale to capture a company's environmental disclosure is appropriate as it allows for an integration of different types of information into a single figure that is comparable across companies (Cormier *et al*., 2005). In this regard, it is also possible to assess the quality or the value relevance of the disclosed information by assigning weights and defining scores that vary according to the kind of analysis. Because redundant information has no information value, the current study excludes repeated information from the coding process, focusing on unique items of information.

Starting the actual recording process, every annual report was wholly scanned before coding to make a judgment about whether any particular item is relevant to any of the disclosure categories and to gain a primary understanding. This procedure reduced the subjectivity in determining applicable items. During the recording process, the context and meaning behind the specific disclosure item is stressed to ensure that it constitutes environmental disclosure. Narrative as well as non-narrative disclosures, including pictures, photographs, charts and graphical representations, are examined for any relevant disclosure items. Because the study focuses on information content it was possible to have one sentence containing two or more pieces of information. It was also possible to find two or more sentences containing only one piece of information.

Repeated information within an annual report was not coded, and hence the same information was only considered once.

A content analysis form or a copy of the checklist was used for recording data from the annual reports. There is one data-entry form for each company for each year. The quantity of disclosure was recorded by ticking the relevant item in the checklist, while the quality of disclosure was captured for the ticked item by assessing and recording each of its qualitative characteristics or quality-component measures (see Table 4.4). The content of the forms was then transferred into a data sheet in the form of a computerised Excel file. The data filled in this Excel file was crosschecked against the data manually recorded on the hard forms to ensure that the entry process was correctly accomplished free from errors. The mathematical capabilities of Microsoft Excel was utilized to generate sums of each category of environmental disclosure as well as a total environmental disclosure score and to compute the disclosure indices. A database in Microsoft Excel was set up for further processing of the data collected.

4.7.3.4.1 Environmental Disclosure Quantity Coding

Having decided on the classification framework of environmental disclosures, the next step is to quantify the volume of the disclosed information. Environmental disclosure quantity is coded by identifying each environmental information item in the annual report with one of the checklist items using predetermined decision rules. This procedure allowed the codification of the disclosed information into predefined categories. As long as quantity measurement is intended, dichotomous scores are used to examine the presence or absence of the different items of the checklist using binary codes. The presence or disclosure of an item in the annual reports is coded (1), while the absence or non-disclosure of an item in the annual reports is coded (0).

As no specific user group is of particular interest to the research, but rather all diverse stakeholder groups are targeted, an un-weighted scoring is deemed appropriate. This approach does not discriminate between the relative importance of the items of information; i.e. it only emphasizes the presence of environmental disclosures. In addition, the un-weighted scores help in mitigating the problems of subjectivity by

minimizing the scoring bias associated with the weighting approach (Chau, and Gray, 2002). Quantification for each of the disclosure categories, therefore, consisted of recording whether or not a company made a disclosure in the category. Added together, they form the total amount of environmental disclosure per company.

4.7.3.4.2 Environmental Disclosure Quality Coding

Having processed the coding or recording of the disclosed environmental information items among the relevant disclosure categories, the next step is to analyze the nature of such information. Environmental disclosure quality is coded by assessing the informational content or the qualitative characteristics of the different disclosure items found in the checklist. Botosan (2004) argues that the definition of quality should be based on well-supported frameworks elaborated by professional accounting bodies and standard setters because they reflect a generally accepted notion of disclosure quality. This perspective quite fits with the purpose of the current study as no specific user group is of particular interest to the research, but rather all diverse stakeholder groups are targeted. A broader all-purpose definition of disclosure quality, therefore, seems appropriate. Consistent with Botosan's (2004) approach, corporate environmental disclosure quality is defined in the current study in terms of the information qualities or characteristics identified by the International Accounting Standards Board (IASB); comparability, understandability, relevance, and reliability (IASB, 1989).

For the purposes of the current study, comparability, understandability, relevance, and reliability are defined in a manner consistent with the IASB framework. The current study proposed operational definitions for these informational qualities based on prior literature to help assess the informational content of the different disclosure items of the checklist. 'Comparability' is permitted with the financial quantification of information that can be elaborated through non-financial quantification and descriptive forms. 'Understandability' is facilitated when the economic direction or sign of information is clear. 'Relevance' is achieved via the provision of forward-looking information in addition to historical information. 'Reliability' is assured through verification or auditing (see section 4.7.4.1.2 for illustration).

A framework for the analysis of environmental disclosure quality is suggested that considers four different but complementary quality dimensions. Specifically, environmental disclosure quality is measured according to four parameters, namely, type, direction, outlook and verifiability as defined by the International Accounting Standards Board (IASB). These quality parameters or dimensions correspond to the information qualities of comparability, understandability, relevance, and reliability respectively. Table 4.4 depicts the proposed operational definitions for environmental disclosure quality dimensions. 'Type' refers to the quantification nature of information; whether it is monetary quantitative (financial quantification), non-monetary quantitative (non-financial quantification) or declarative (no quantification). 'Direction' refers to the economic sign of information; whether it is good (specific credit), bad (specific discredit) or neutral (no specific credit or discredit). 'Outlook' refers to the time orientation of information; whether it is forward-looking (future oriented) or historical (past or present oriented).'Verifiability' refers to the auditability of information; whether it is verifiable (veracity checked) or non-verifiable (veracity not checked).

Each of these classifications is in line with previous literature that investigated disclosure quality identification and assessment. There have been attempts by researchers to examine a combination of some of these information qualities, although no prior study – as far as I am aware – has attempted to combine all four parameters together or explicitly associate them with information quality characteristics set by professional accounting bodies or standard setting organizations. However, a few recent studies suggested disclosure indices that assess disclosure quality according to the requirements and guidelines of standard setters including the Financial Accounting Standard Board (FASB) and Global Reporting Initiative (GRI) (see Beretta and Bozzolan, 2008; Brammer and Pavelin, 2008; Clarkson *et al.*, 2008). Guthrie and Parker (1990) first raised this issue indicating that the analysis of corporate disclosure should focus on both "what was said and how it was said". Consistent with this perspective, many researchers have gone beyond only counting the number of disclosures made, and have assigned weights to the information based on the type of information disclosed (Botosan, 1997; Bozzolan *et al.*, 2003).

Table 4.4

Proposed Environmental Disclosure Quality Measures

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(1) Type (Comparability)

Monetary quantitative: Statement containing quantitative information that is related primarily to financial disclosure of actual financial numbers.

Non-Monetary quantitative: Statement containing quantitative information that is related primarily to actual numbers of a non-financial nature.

Declarative: Statement containing narrative or descriptive information that does not contain either monetary quantitative or non-monetary quantitative information.

(2) Direction (Understandability)

Good: Statement including specific information details that reflect credit to the company.

Bad: Statement including specific information details that reflect discredit to the company.

Neutral: Statement of policy or intent with no details and statement of facts whose credit or discredit to the company is not obvious.

(3) Outlook (Relevance)

Forward-Looking: Statement reflecting commitment to future policies and/or actions as well as expectations about future conduct.

Historical: Statement reflecting facts about past or present policies and/or actions as well as the actual or achieved conduct.

(4) Verifiability (Reliability)

Verifiable: Statement indicating external verification, review, scoping, and/or audit of environmental disclosure.

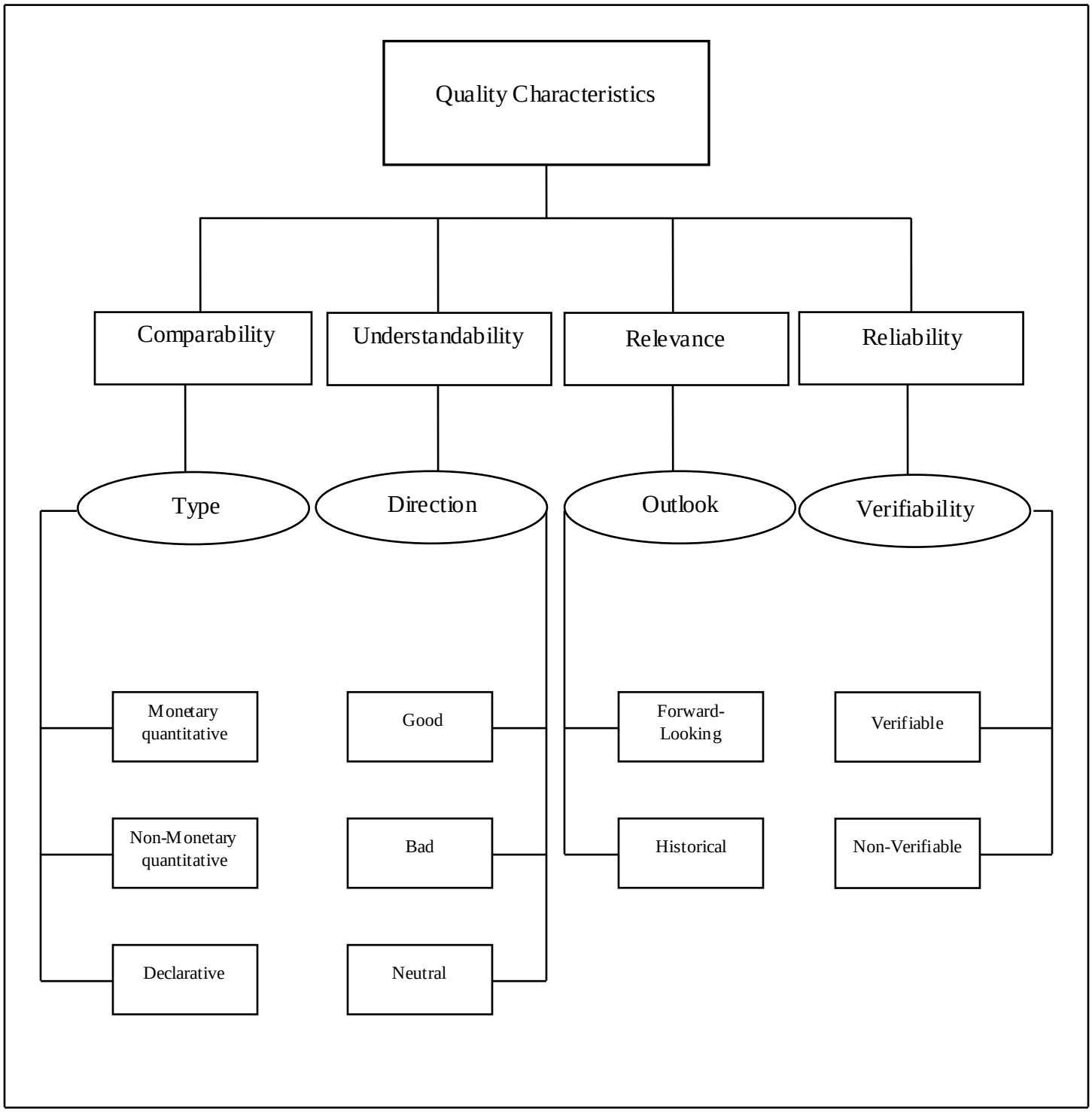
Non-Verifiable: Statement indicating no mention or reference to external verification, review, scoping, and/or audit of environmental disclosure.

The framework suggested by the current study for assessing disclosure quality follows a similar line of thinking. Therefore, the disclosure quality score proposed includes measures of monetary quantitative versus non-monetary quantitative or declarative (e.g. Al-Tuwaijri *et al.*, 2004; Beretta and Bozzolan, 2008; Boesso and Kumar, 2007; Cooper and Zainudin, 2009; Gray *et al.*, 1995b; Magness, 2006; Toms; 2002; Wiseman, 1982); good or bad versus neutral (e.g. Beretta and Bozzolan, 2008; Bozzolan *et al.*, 2009; Gray *et al.*, 1995b); forward-looking versus historical (e.g. Beretta and Bozzolan, 2008; Boesso and Kumar, 2007; Brammer and Pavelin, 2008; Magness, 2006; O'Sullivan *et al.*, 2008); and verifiable versus non-verifiable (e.g. Bozzolan *et al.*, 2009; Brammer and Pavelin, 2008; Gray *et al.*, 1995b; Prado-Lorenzo, 2009; Toms, 2002) information items. This type of score provides greater insight into the subtle nature of disclosure information than is permitted by the measure of volume only. In addition, classifying the information in this manner particularly fits with the purpose of the current study as it would permit a closer examination of the effectiveness of environmental disclosures in managing various stakeholder groups. Figure 4.4 presents the proposed framework for assessing corporate environmental disclosure quality.

It is worth mentioning, however, that these quality measures are considered complements rather than substitutes. In other words, they do not represent different proxies for environmental disclosure quality, but they are regarded as component measures that together make up the aggregate quality of such disclosure. Accordingly, an attempt has been made to classify each environmental information item in the annual reports as possessing one of the individual quality characteristics within each quality dimension or sub-quality. In addition to classifying the information, relative weights have also been assigned to the quality of information disclosed within each of the four dimensions listed above. Therefore, the quality of the disclosed information is assessed by assigning weights and defining scores that vary according to the distinct nature of the disclosure items. Higher weights are assigned to monetary quantitative (3) as opposed to non-monetary quantitative (2) or declarative (1); good (2) or bad (2) versus neutral (1); forward-looking (2) compared to historical (1); and verifiable (2) versus non-verifiable (1) information. It can be argued that these kinds of information are likely to give stakeholders a better perspective and increased credibility of a company's reporting in terms of overall value creation.

Figure 4.4

Proposed Framework For Environmental Disclosure Quality Assessment



Monetary quantitative and non-monetary quantitative disclosures were weighted more heavily in the disclosure index than declarative disclosures because quantified information is more precise and, hence, more useful (Boesso and Kumar, 2007; Botosan, 1997) in the decision-making process of various information users or stakeholders. Quantification of information is considered more informative in reporting corporate performance (Raar, 2007). The significance of precision underlying information quantification is particularly emphasized in determining the quality of environmental disclosures (see Brammer and Pavelin, 2008; Cormier *et al.*, 2005). However, monetary quantitative disclosures were weighted more heavily than non-monetary quantitative ones because they help stakeholders in assessing the financial implications of environmental decisions or actions. Moreover, monetary presentation of the company's environmental performance is in line with that of its financial performance. The integration of both corporate economic and environmental performances is an important element in demonstrating how the company reconciles possible conflict between the financial and environmental objectives and interests of different stakeholders (Gray, *et al.*, 1995b). Such financial integration also permits the assessment of the environmental impact of any decisions or actions on the overall corporate performance.

Good and bad news were awarded a higher score than neutral ones since they provide stakeholders with a specific economic direction of the company's environmental activities, thereby facilitating the interpretation of the economic impact of such activities. However, good and bad news were awarded equal scores because the study's purpose is to assess disclosure quality in terms of whether or not the disclosed information has specific economic direction, regardless of which way that direction is. Guthrie and Mathews (1985) first raised the issue and suggested that news need to be assessed. Following a similar approach, Gray *et al.* (1995b) emphasized that disclosure quality can be captured by analyzing whether the disclosed information refers to events that reflect well, badly or neutrally on the reporting company.

Forward-looking information was weighted more heavily in the disclosure index than historical information as the disclosure of such information is likely to provide more guidance on future decisions and expectations about the company's prospects. A financial report containing forward-looking information is more likely to be perceived

as being of higher quality (Ajinkya *et al.*, 2005; Karamanou and Vafeas, 2005; Clarkson *et al.*, 1994) and, hence, forward-looking information can be viewed as one dimension of reporting quality (O'Sullivan *et al.*, 2008). According to Beretta and Bozzolan (2008), forward-looking information is quality information if it leads to better analysts' inferences and supports better future earnings estimates. Forward-looking information that is based on well-founded expectations enhances corporate accountability by reducing information asymmetries (Hooks *et al.*, 2002). Moreover, Lev and Zarowin (1999) highlight the value relevance of forward-looking information, where the company's projections may help resolve future uncertainty. In this regard, the authors emphasize that understanding the past requires improved information about the future.

Verifiable disclosures are of greater significance than non-verifiable disclosures because audited information increases the credibility of a company's reporting by assuring the accuracy and veracity of such disclosures, which in turn provides stakeholders with a reliable foundation on which to base their decisions. It is argued that undertaking assurance on sustainability and environmental disclosures results in increased stakeholder confidence in the quality of the disclosed information as well as increased stakeholder trust in the degree of a company's commitment to sustainability and environmental agendas (Simnett *et al.*, 2009). Moroney *et al.* (2009) particularly found that environmental assurance is associated with the quality of corporate environmental disclosures. Solomon (2000) conducted a survey of environmental reporting aspects and concluded that verification is necessary for such reporting. It seems appropriate, therefore, to assign a higher weight to verifiable disclosures.

4.7.3.4.3 Reliability Of The Coding Process

Rigorous reliability is demonstrated both in the coding definitions and measuring instrument developed to identify and classify annual report disclosures and in the accuracy and consistency with which the researcher has applied these definitions and instrument. The former is called measurement reliability while the latter is called coding reliability (Milne and Adler, 1999). Three forms of reliability of content analysis and disclosure measurement; including stability, reproducibility and accuracy

(Krippendorff, 1980), are evaluated through four procedures. First, reliability is determined through conducting a pilot study using a sample of annual reports of 50 companies for the year 2007. Second, content analysis of the annual reports used in the pilot study was conducted twice at different dates. Third, inter-coder reliability is enhanced through examining some annual reports by two coders; researcher and independent coder. Fourth, decision rules are established and revised to facilitate codifying data gleaned from content analysis of annual reports.

After examining some annual reports and before finalizing the categories and decision rules, a pilot study aimed at testing the reliability of the constructed checklist was conducted. Specifically, the pilot study is carried out to test the applicability of the checklist to the UK context, to ensure that there is some variability in disclosure between different companies, to capture items not yet included in the initial list and to eliminate those that were not disclosed by any of the sample companies. Through the pilot study, the researcher read over a sample of 50 annual reports for the year 2007 selected randomly from different industrial sectors in the sample population. The sample annual reports were content analyzed to get grasp of what themes or categories are common in UK annual reports, given the different contexts involved in constructing the research instrument or the checklist; including UK, New Zealand, US, Canada, Germany, and France, although each of which is a Western context. The results of the pilot study revealed that the research instrument or the checklist developed is applicable to the UK context as almost all of the environmental themes in annual reports fell within one of the categories already established.

However, there are few disclosures that did not fit in any of the disclosures categories. These include such examples as membership of and/or accreditation by environmental development organizations, inclusion in corporate social and environmental responsibility indices (e.g. FTSE4Good Index), and launching new environmental reporting system. These additional disclosures, however, are added to the 'Other Environmentally-Related Information' category as an item called 'Any environmental issues other than the above'. These additional environmental disclosures might be a manifestation of changes over time in environmental reporting guidelines such as the emergence of GRI, environmental management systems, and the consequent environmental quality assessment criteria and certification. In addition, there are few

information items among the GRI guidelines that rarely, if ever, disclosed by companies, which can be regarded as inapplicable items. Inapplicable items are excluded from the analysis as companies should not be penalized for non-disclosure of these items (Chau, and Gray, 2002; Cooke, 1989). Examples of such disclosures include information about linking executive compensation to environmental performance and adoption of GRI reporting guidelines.

As an initial pre-testing of the reliability of the coding process, content analysis of the annual reports used in the pilot study was conducted twice at different dates to test for the stability form of reliability (Krippendorff, 1980) and to check the face validity of the numerical results arrived at. Slight differences were observed between both rounds which, in turn, suggest that results are replicable. The content analysis forms filled in each round were compared for any discrepancies, where sometimes there were missing items or over-generously coded items as well as few incidence of switching of items within a disclosure category. However, there weren't any differences as regards the assignment of disclosure items to the main categories. In this respect, both completeness and accuracy of the recording process were assured as any detected errors were promptly corrected.

The reproducibility form of reliability (Krippendorff, 1980) was tested using inter-coder reliability (Milne and Adler, 1999; Sekaran, 2003) by having another researcher independently undertake some of the content analysis for a small sample of annual reports to ensure accuracy and consistency (see for example Milne and Adler, 1999). The multi-coder perspectives are captured in order to minimize any ambiguity and overlapping of meanings or interpretations. Minor variations and disagreements between the two coders; researcher and independent coder, were found mainly due to items not counted among disclosures. Differences in the coding process between the two coders are then discussed to reach a consensus and inconsistencies are reconciled. In this respect, the objectivity and reliability of the coding process are greatly enhanced.

In addition, the coding process of assigning environmental disclosures in the annual reports to checklist items is carried out using predetermined decision rules. Decision rules are established based on those rules developed by the UK Center of Social and Environmental Research (CSEAR) and guidelines on performance indicators

developed by the Global Reporting Initiative (GRI, 2006). Some changes with respect to the decision rules are undertaken where additions are performed to include any further relevant items. Well-established decision rules and procedures enhance the objectivity and the accuracy form of reliability of the research instrument used and, therefore, allow replication by other researchers (Krippendorff, 1980). Detailed presentation of the decision rules for coding each of environmental disclosure quantity and quality are shown in Appendix B and Appendix C respectively.

Minor amendments in disclosure categories and the decision rules defining them were undertaken following the pilot study conducted and repeated over time and the multi-coder perspectives captured to enhance the reliability of content analysis and disclosure measurement. Consequently, objectivity is achieved through the development of disclosure categories to encompass all themes and items of environmental disclosure with even new themes arising over time. This is in addition to clearly defined and precise decision rules which make the categories exhaustive; i.e. all relevant items in the sample annual reports are placed within a category, and mutually exclusive; i.e., each relevant item is not classified under more than one category (Gray *et al.*, 1995b; Krippendorff, 1980).

4.7.3.5 Measurement And Disclosure Indices

The checklist is used to derive disclosure indices for each of the quantity and quality of total corporate environmental disclosure as well as for each of the quantity and quality of each corporate environmental disclosure category. Disclosure indices are often applied in accounting research, particularly in studies that examine annual reports, where they provide a single-figure summary indicator either of the entire contents of corporate reports or of particular aspects of interest such as environmental disclosures (Ahmed and Courtis, 1999; Coy and Dixon, 2004). They are computed in order to permit further analysis of the data. The disclosure index is a percentage of the actual disclosure scores awarded to a company to the maximum possible disclosure required or expected (Cooke, 1989).

Both weighted (e.g. Barako *et al.*, 2006; Boesso and Kumar, 2007; Cooper and Zainudin, 2009; Cormier *et al.*, 2005) and un-weighted (e.g. Chau, and Gray, 2002; Ghazali, 2007; Haniffa and Cooke, 2005; Monteiro and Aibar-Guzmán, 2010) disclosure indexes have been used in voluntary disclosure literature, each of which has its criticism. An un-weighted index, that uses dichotomous scores or nominal values of 1 and 0 for disclosure and nondisclosure of specified items, has been criticized for its basic assumption that all items are equally important (Barako *et al.*, 2006). Un-weighted indices can only measure the quantity of disclosure (Beretta and Bozzolan, 2008). As long as quality measurement is intended, a weighted index is deemed appropriate in order to differentiate between the varying degrees of disclosure quality. A weighted index assigns weights according to predefined rankings that reflect the importance attributed by different users of information or the nature of the disclosed information (Beretta and Bozzolan, 2008). Weighted indices incorporate ordinal values, usually three levels, to assess disclosure quality (Beattie *et al.*, 2004). A weighted disclosure index has been criticized for its subjectivity and bias towards particular users (Barako *et al.*, 2006). Notwithstanding the inherent subjectivity, disclosure indices have proved to be a valuable research tool in corporate disclosure research (Beattie *et al.*, 2004). In this regard, the validity of the disclosure measurement needs to be ascertained.

Disclosure quality indices can be used to analyze corporate environmental disclosures from two different perspectives (Beretta and Bozzolan, 2004). The first perspective involves developing a composite measure of the quality of environmental disclosures. The overall quality index is calculated as the simple arithmetic mean of the sub-quality indices. In this regard, disclosure sub-quality indices have to be standardized to avoid a scale effect. The second perspective integrates all sub-qualities of environmental disclosures into the analysis in order to better portray the different quality dimensions of the company's disclosure strategy. While a composite or summary measure, that collapses different dimensions into a single value, is useful in associating disclosure quality with other variables of interest, sub-quality measures provide deeper understanding of and richer insights into disclosure quality (Beattie *et al.*, 2004), thereby help to comprehensively profile the disclosure quality strategies adopted by the company (Beretta and Bozzolan, 2004).

4.7.3.5.1 Environmental Disclosure Quantity Index

An un-weighted disclosure quantity index or dichotomous scores are used to examine the presence or absence of the different items of the checklist using binary codes. As no specific user group is of particular interest to the research, but rather all diverse stakeholder groups are targeted, an un-weighted index is deemed appropriate. In addition, the un-weighted index helps in mitigating the problems of subjectivity by minimizing the scoring bias associated with the weighting approach (Chau, and Gray, 2002). The presence or disclosure of an item in the annual reports is coded (1), while the absence or non-disclosure of an item in the annual reports is coded (0). This approach does not discriminate between the relative importance of the items of information; i.e. it only emphasizes the presence of environmental disclosures.

A total score is awarded to each environmental disclosure category in the checklist by adding the scores of all items within the category. A total score is also awarded to total corporate environmental disclosure by adding the scores of all disclosure categories to derive an aggregate score for the company. The maximum applicable quantity score which a sample company could earn for the most comprehensive disclosure is 34. Disclosure quantity indices are then computed as the percentage of the quantity score awarded to maximum applicable quantity score. Hence, Total Corporate Environmental Disclosure Quantity Index is calculated as the percentage of total quantity score awarded to maximum applicable quantity score. Similarly, Corporate Environmental Disclosure Category Quantity Index is calculated as the percentage of category quantity score awarded to maximum applicable category quantity score.

Corporate Environmental Disclosure Quantity Index for each company is computed according to the following equation:

$$\text{CED Quantity} = \frac{\sum_{i=1}^{n} \text{Quantity}_i}{\text{MAX Quantity}}$$

Where:

CED Quantity = Corporate Environmental Disclosure Quantity Index,

$Quantity_i$ = 1 if item *i* is disclosed; 0 if item *i* is not disclosed,

MAX Quantity = maximum applicable disclosure quantity score,

n = number of items disclosed.

The same procedure has been followed to compute environmental disclosure quantity index for both total disclosure and each disclosure category in the checklist.

4.7.3.5.2 Environmental Disclosure Quality Index

A framework for the analysis of environmental disclosure quality is suggested by the current study that considers four different but complementary quality dimensions. Specifically, environmental disclosure quality is measured according to four parameters, namely, type, direction, outlook and verifiability as defined by the International Accounting Standards Board (IASB). These quality dimensions or parameters correspond to the four information qualities of comparability, understandability, relevance, and reliability respectively as defined by the International Accounting Standards Board (IASB). A weighted disclosure quality index is developed to assess the informational content or the qualitative characteristics of the different disclosure items of the checklist. As long as quality measurement is intended, a weighted index is deemed appropriate in order to differentiate between the varying degrees of disclosure quality.

A different weight is assigned to each individual quality characteristic within each quality dimension or sub-quality in an attempt to capture the distinct nature of the disclosure items. Higher weights are assigned to monetary quantitative (3) as opposed to non-monetary quantitative (2) or declarative (1); good (2) or bad (2) versus neutral (1); forward-looking (2) compared to historical (1); and verifiable (2) versus non-verifiable (1) information. As scoring scales for each quality dimension are different, scores have been proportionally re-scaled to allow the computation of a composite measure for aggregate quality for each of total disclosure and its categories. This re-scaling procedure is based on the best practice; that is the maximum possible total

quality scores for each dimension. In this regard, disclosure sub-quality indices have to be standardized to avoid a scale effect.

A total sub-quality score is awarded to each environmental disclosure category in the checklist by adding the sub-quality scores of all items within the category. A total sub-quality score is also awarded to total corporate environmental disclosure by adding the sub-quality scores of all disclosure categories to derive an aggregate sub-quality score for the company. The maximum applicable total sub-quality scores which a sample company could earn for the highest quality disclosure of 34 items are 102, 68, 68, and 68 for each of Type (comparability), Direction (understandability), Outlook (relevance), and Verifiability (reliability) respectively. Disclosure sub-quality indices are then computed as the percentage of the sub-quality score awarded to maximum applicable sub-quality score. However, overall disclosure quality indices are computed as the arithmetic mean of the four sub-quality indices.

Hence, Total Corporate Environmental Disclosure Sub-Quality Index is calculated as the percentage of total sub-quality score awarded to maximum applicable sub-quality score. Similarly, Corporate Environmental Disclosure Category Sub-Quality Index is calculated as the percentage of category sub-quality score awarded to maximum applicable category sub-quality score. Collectively, Total Corporate Environmental Disclosure Quality Index is calculated as the arithmetic mean of the four sub-quality indices for all disclosure items or categories. Similarly, Corporate Environmental Disclosure Category Quality Index is calculated as the arithmetic mean of the four sub-quality indices for the category.

Corporate Environmental Disclosure Sub-Quality Index for each company is computed according to the following equation:

$$\text{CED Sub-Quality} = \frac{\sum_{i=1}^{n} \text{Sub-Quality}_i}{\text{MAX Sub-Quality}}$$

Where:

CED Sub-Quality = Corporate Environmental Disclosure Sub-Quality Index,

Sub-Quality$_i$ = scoring scale for each sub-quality is applied to item *i*,

MAX Sub-Quality = maximum applicable disclosure sub-quality score,

n = number of items disclosed.

Using the above formula, Corporate Environmental Disclosure Index for each of the four Sub-Qualities of Type, Direction, Outlook, and Verifiability are computed for each company. The same procedure has been followed to compute environmental disclosure sub-quality index for both total disclosure and each disclosure category in the checklist.

Corporate Environmental Disclosure Type Index for each company is computed according to the following equation:

$$\text{CED Type} = \frac{\sum_{i=1}^{n} \text{Type}_i}{\text{MAX Type}}$$

Where:

CED Type = Corporate Environmental Disclosure Type Index,

Type$_i$ = 3 if item *i* is monetary quantitative; 2 if item *i* is non-monetary quantitative; 1 if item *i* is declarative,

MAX Type = maximum applicable disclosure type score,

n = number of items disclosed.

Corporate Environmental Disclosure Direction Index for each company is computed according to the following equation:

$$\text{CED Direction} = \frac{\sum_{i=1}^{n} \text{Direction}_i}{\text{MAX Direction}}$$

Where:

CED Direction = Corporate Environmental Disclosure Direction Index,

$Direction_i$ = 2 if item *i* is good; 2 if item *i* is bad; 1 if item *i* is neutral,

MAX Direction = maximum applicable disclosure direction score,

n = number of items disclosed.

Corporate Environmental Disclosure Outlook Index for each company is computed according to the following equation:

$$\text{CED Outlook} = \frac{\sum_{i=1}^{n} \text{Outlook}_i}{\text{MAX Outlook}}$$

Where:

CED Outlook = Corporate Environmental Disclosure Outlook Index,

$Outlook_i$ = 2 if item *i* is forward-looking; 1 if item *i* is historical,

MAX Outlook = maximum applicable disclosure outlook score,

n = number of items disclosed.

Corporate Environmental Disclosure Verifiability Index for each company is computed according to the following equation:

$$\text{CED Verifiability} = \frac{\sum_{i=1}^{n} \text{Verifiability}_i}{\text{MAX Verifiability}}$$

Where:

CED Verifiability = Corporate Environmental Disclosure Verifiability Index,

$Verifiability_i$ = 2 if item *i* is verifiable; 1 if item *i* is non-verifiable,

MAX Verifiability = maximum applicable disclosure verifiability score,

n = number of items disclosed.

Corporate Environmental Disclosure Quality Index for each company is computed according to the following equation:

$$\text{CED Quality} = \frac{\left[\text{CED Type}_i + \text{CED Direction}_i + \text{CED Outlook}_i + \text{CED Verifiability}_i\right]}{4}$$

Where:

CED Quality = Corporate Environmental Disclosure Quality Index,

CED Type_i = Corporate Environmental Disclosure Type Index,

CED Direction_i = Corporate Environmental Disclosure Direction Index,

CED Outlook_i = Corporate Environmental Disclosure Outlook Index,

$\text{CED Verifiability}_i$ = Corporate Environmental Disclosure Verifiability Index.

The same procedure has been followed to compute environmental disclosure quality index for both total disclosure and each disclosure category in the checklist.

4.7.3.5.3 Validity Of Disclosure Measurement

Although a self-constructed disclosure index is a useful research tool in capturing disclosure practices, it requires subjective assessments by the researcher in its development and application (Botosan, 1997). Therefore, various tests are essential to assess the validity of the disclosure index. Validity represents evidence that the instrument, technique or process used to measure a concept does indeed measure the intended concept (Sekaran, 2003: 425). The validity of the disclosure indices are assessed using content validity and construct validity.

Content validity ensures that the measure includes an adequate and representative set of items that tap the concept (Sekaran, 2003). Several ways can be employed to attest content validity including careful definition of the research phenomena under investigation through extensive literature review and the use of a panel of expert judges (see section 4.7.3.3 for ensuring content validity in checklist development). Three UK academics have been asked to refine the preliminary checklist, one of them

has considerable practical accounting and auditing experience with UK listed companies. Construct validity focuses on consistency with theoretical expectations and evidence from literature. Correlation analysis is suggested as a means by which construct validity can be established (Sekaran, 2003).

Correlation coefficients have been used in prior disclosure studies to assess the validity of disclosure scores (see Ahmed and Courtis, 1999; Botosan, 1997; Cheng and Courtenay, 2006). Following these studies, correlation analysis of the total environmental disclosure index and its component indices of environmental disclosure categories was conducted. Both Pearson and Spearman correlation coefficients show that, for each of disclosure quantity and quality, the indices of all environmental disclosure categories are highly correlated to total environmental disclosure index (see section 5.3.2.1 and section 6.3.2.1 for construct validity). This indicates how well the classification or grouping scheme interprets the total score. Moreover, it is expected that a company's disclosure strategies are similar as to the different categories of disclosure (Botosan, 1997; Cheng and Courtenay, 2006). In this respect, the results also reveal that the indices of the different environmental disclosure categories are correlated to each other.

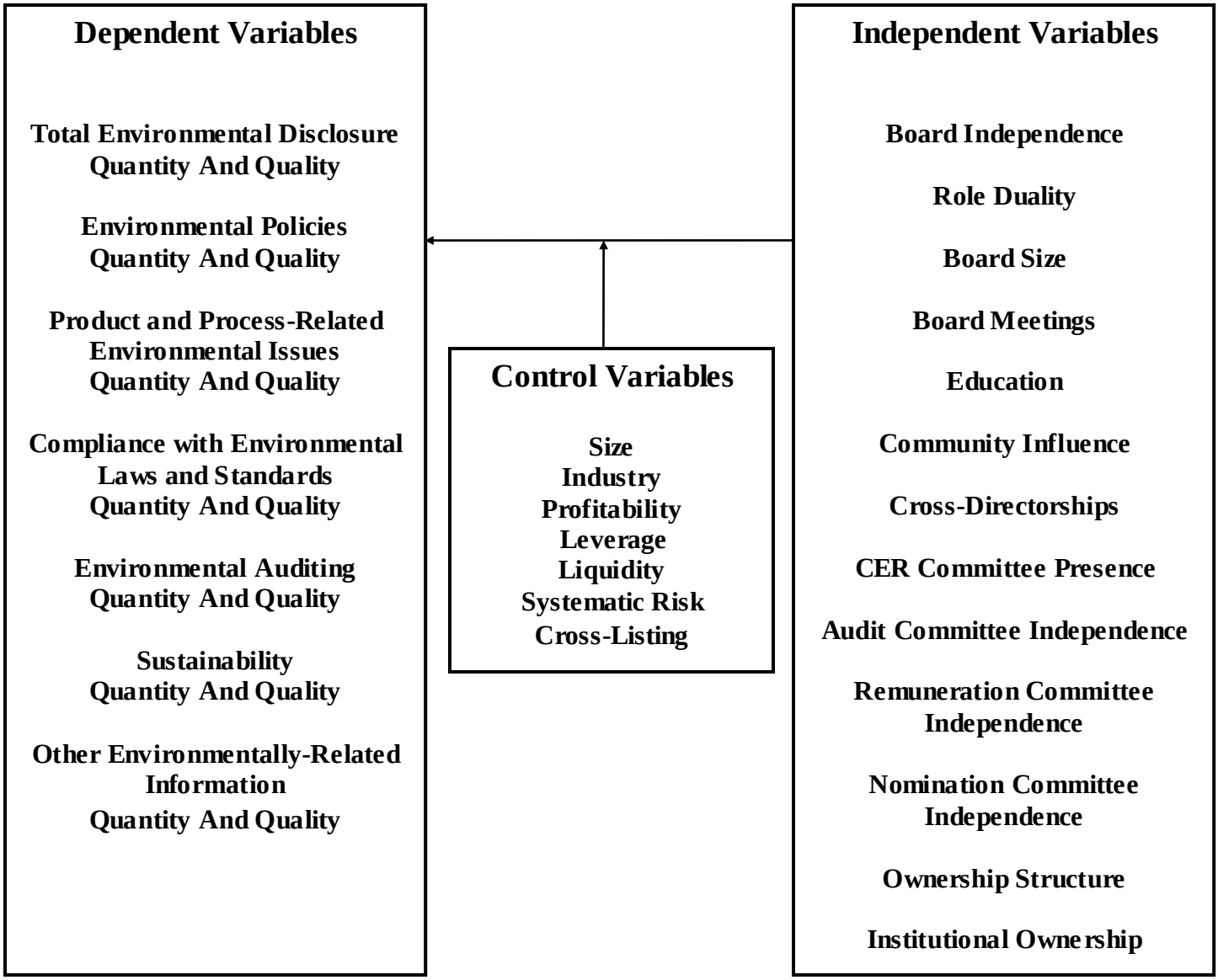
In addition, correlation between disclosure indices and significant explanatory variables identified in prior studies has been used to validate the disclosure index (see Ahmed and Courtis, 1999; Botosan, 1997). Therefore, the correlation between each of environmental disclosure quantity and quality indices and two corporate characteristics, documented by prior disclosure studies to be key determinants explaining the variation in disclosure practices, is investigated. These include company size and industry. Pearson and Spearman correlation coefficients indicate that disclosure quantity and quality indices are correlated to each of the two corporate characteristics (see section 5.3.2.1 and section 6.3.2.1 for construct validity). Taken together the results confirm that disclosure indices have a considerable degree of validity in that they consistently capture environmental disclosure practices in the annual reports.

4.7.4 Definition And Measurement Of Variables

The following figure, Figure 4.5, depicts the variables used by the current study to examine the extent and quality of corporate environmental disclosure practices and their association with corporate governance mechanisms.

Figure 4.5

Research Variables Framework



4.7.4.1 Dependent Variables

The dependent variable of the current study is corporate environmental disclosure in the annual reports of UK listed companies. Both the quantity and the quality of such disclosure are examined as totals, in addition to disclosure quantity and quality for each disclosure category. Hence, the dependent variables include total corporate environmental disclosure quantity, corporate environmental disclosure quantity in each disclosure category, total corporate environmental disclosure quality and corporate environmental disclosure quality in each disclosure category.

4.7.4.1.1 Environmental Disclosure Quantity

"Environmental disclosures constitute part of what frequently are labelled social responsibility disclosures. Social responsibility disclosures can include, among other things, disclosures relating to the interaction between an organization and its physical environment" (Deegan and Rankin, 1996: 51). Corporate environmental disclosure can be defined as the process of disseminating information on the impact corporate economic activities have on the natural environment for use by diverse stakeholders. Corporate environmental disclosure extends the accountability of companies beyond the traditional role of providing financial disclosure assuming that companies have wider environmental responsibilities (Gray *et al.*, 1987). The most distinguishing feature of environmental disclosure is its voluntary nature, particularly in the UK context. Consequently, environmental reports are characterized by their diversity in terms of disclosure quantity and quality.

The dependent variable, corporate environmental disclosure quantity, is measured using an un-weighted disclosure index developed and applied over a checklist of environmental disclosure items. The disclosure checklist is constructed as a measuring instrument and is composed of different sections showing the different categories or areas to which each environmental disclosure information belongs. Table 4.3 shows the checklist comprising the different environmental disclosure categories and items. The disclosure index is calculated based on of the presence or absence of each item in the annual reports using binary codes, where the presence of

the item in the annual report is coded (1), while the absence of the item is coded (0). A total score is awarded to each disclosure category as well as to total disclosure in the checklist.

Disclosure quantity indices are then computed as the percentage of the quantity score awarded to maximum applicable quantity score. Hence, Total Corporate Environmental Disclosure Quantity Index is calculated as the percentage of total quantity score awarded to maximum applicable quantity score. Similarly, Corporate Environmental Disclosure Category Quantity Index is calculated as the percentage of category quantity score awarded to maximum applicable category quantity score. Following is a presentation of the different categories of corporate environmental disclosure.

4.7.4.1.1.1 Environmental Policies

Environmental Policies refer to public statements of an organization's philosophy, intentions, and objectives with respect to the environment. An environmental policy can be viewed as a framework within which a company manages its environmental impacts. Environmental policies include any formal statements specified and/or implemented by the company regarding its environmental performance and activities. This disclosure category covers strategies, claims, visions, and actions proposed towards environmental protection as well as health and safety issues.

4.7.4.1.1.2 Product and Process–Related Environmental Issues

Product And Process-Related Environmental Issues are concerned with any damage to the environment resulting from the manufacturing or use of products such as pollution emissions or waste generation, as well as environmental protection resulting from improvements in the products or their processing such recycling, energy efficiency, and product safety.

4.7.4.1.1.3 Compliance with Environmental Laws and Standards

Compliance With Environmental Laws And Standards disclosure category reflects how companies are operating under a regulatory environment that is increasingly subject to changes as standards improve as well as the degree to which companies are in conformity with such environment. This disclosure category includes any statements indicating the company's compliance with pollution laws, health and safety standards and regulations, and environmental management standards such as ISO, BS OHSAS and PAS.

4.7.4.1.1.4 Environmental Auditing

Environmental Auditing refers to environmental review, scoping, audit and assessment including independent attestation. Environmental Audit can be viewed as a management tool comprising systematic, documented, periodic and objective evaluation and assessment of both corporate environmental performance and environmental disclosure. Therefore, this disclosure category includes any reference to environmental internal or external audit or verification of environmental performance or systems such as environmental site and facilities assessment, environmental machinery and equipment assessment, environmental risk assessment and the like. Also included in this category is any reference to environmental internal or external audit or verification of environmental information disclosure.

4.7.4.1.1.5 Sustainability

Sustainability simply refers to the maintenance of well being. Sustainability is concerned with the effect of a present action on the availability of future options (Aras and Crowther, 2008). Hence, sustainable development is a pattern of resource use that meets present human needs while preserving the environment; that is without compromising the ability of future generations to meet their needs. This disclosure category also includes statements about the impact of a company's activities on such issues as biodiversity, climate change, acid rain and global warming.

4.7.4.1.1.6 Other Environmentally-Related Information

Other Environmentally-Related Information disclosure category includes statements addressing any environmental issues or information that is not included in any of the above disclosure categories. Examples of such disclosures include receiving environmental or safety awards, environmental education and training, and environmental litigation. In addition, this disclosure category is intended to capture not only environmental issues that do not fit in any of the other categories but also those issues that do not match one of the items specified by this category.

4.7.4.1.2 Environmental Disclosure Quality

Quality is a generic and holistic term that has different meanings to different people. Several definitions of disclosure quality have been suggested in prior literature. Each of these definitions refer to a particular qualitative characteristic of the disclosed information and largely dependent upon the purpose of the research. Botosan (2004) argues that the definition of quality should be based on well-supported frameworks elaborated by professional accounting bodies and standard setters because they reflect a generally accepted notion of disclosure quality. This perspective quite fits with the purpose of the current study as no specific user group is of particular interest to the research, but rather all diverse stakeholder groups are targeted. A broader and more general all-purpose definition of disclosure quality, therefore, seems appropriate. Consistent with Botosan's (2004) approach, corporate environmental disclosure quality is defined in the current study in terms of the information qualities or characteristics identified by the International Accounting Standards Board (IASB); comparability, understandability, relevance, and reliability (IASB, 1989).

In line with the IASB framework of the qualitative characteristics of information, Botosan (2004: 290) argues that "high-quality information is information that helps users make informed economic decisions". For the purposes of the current study, comparability, understandability, relevance, and reliability are defined in a manner consistent with the IASB framework. 'Comparability' can be defined as the ability of information to consistently allow corporate performance appraisal, pointing out

similarities and differences across time, across companies and across standards and norms through consistent presentation of information in a form that directly reveals impact of environmental activities on overall corporate performance. From the researcher's viewpoint, ‘comparability’ is permitted with the financial quantification of information that can be elaborated through non-financial quantification and descriptive forms. ‘Understandability’ can be defined as the ease with which users of information can perceive, interpret, and evaluate specific environmental topics in terms of their benefit or detriment to corporate performance. According to the researcher, ‘understandability’ is facilitated when the economic direction or sign of information is clear. ‘Relevance’ can be defined as the ability of information to convey expectations about future environmental conduct based on past and present performance. From the researcher's viewpoint, ‘relevance’ is achieved via the provision of forward-looking information in addition to historical information. ‘Reliability’ can be defined as the credibility of information in terms of accuracy and veracity that builds users' confidence and trust in environmental disclosures. According to the researcher, ‘reliability’ is assured through verification or auditing.

Quality assessment is based on the information qualities defined by the International Accounting Standards Board (IASB). A framework for the analysis of environmental disclosure quality is suggested by the current study that considers four different but complementary quality dimensions. Specifically, environmental disclosure quality is measured according to type, direction, outlook and verifiability. These quality dimensions or parameters correspond to the four information qualities of comparability, understandability, relevance, and reliability respectively as defined by the International Accounting Standards Board (IASB). ‘Type’ refers to the quantification nature of information; whether it is monetary quantitative (financial quantification), non-monetary quantitative (non-financial quantification) or declarative (no quantification). ‘Direction’ refers to the economic sign of information; whether it is good (specific credit), bad (specific discredit) or neutral (no specific credit or discredit). ‘Outlook’ refers to the time-frame orientation of information; whether it is forward-looking (future oriented) or historical (past or present oriented). ‘Verifiability’ refers to the auditability of information; whether it is verifiable (veracity checked) or non-verifiable (veracity not checked).

Raar (2007) defines the types of disclosure in terms of their quantification nature. Monetary quantified disclosure is presented in terms of currency. Non- monetary quantified disclosure is expressed in numeric terms other than currency such as weight, volume, size. Declarative disclosure is a qualitative or descriptive prose only. Deegan and Gordon (1996) refer to the news economic direction and differentiate between positive and negative disclosures. Accordingly, Deegan and Rankin (1996: 56) define positive disclosures as "information which presents the company as operating in harmony with the environment" and negative disclosures as "disclosures that present the company as operating to the detriment of the natural environment". According to the ICAEW (2003), Bozzolan *et al*. (2009: 443) define forward-looking as "any information that might have an effect on subsequent financial statements". Verifiable disclosures are those that have been audited by external auditors and, hence, the accuracy and veracity of such disclosures are independently checked, and ascertained.

The dependent variable, corporate environmental disclosure quality, is measured using a weighted disclosure index developed to assess the informational content or the qualitative characteristics of the different disclosure items of the checklist. The disclosure checklist is constructed as a measuring instrument and is composed of different sections showing the different categories or areas to which each environmental disclosure information belongs. Table 4.3 shows the checklist comprising the different environmental disclosure categories and items, while Table 4.4 depicts the proposed operational definitions for environmental disclosure quality dimensions. A different weight is assigned to each individual quality characteristic within each quality dimension or sub-quality in an attempt to capture the distinct nature of the disclosure items. Higher weights are assigned to monetary quantitative (3) as opposed to non-monetary quantitative (2) or declarative (1); good (2) or bad (2) versus neutral (1); forward-looking (2) compared to historical (1); and verifiable (2) versus non-verifiable (1) information. As scoring scales for each quality dimension are different, scores have been proportionally re-scaled to allow the computation of a composite measure for aggregate quality for each of total disclosure and its categories. This re-scaling procedure is based on the best practice; that is the maximum possible total quality scores for each dimension. In this regard, disclosure sub-quality indices have to be standardized to avoid a scale effect.

A total sub-quality score is awarded to each environmental disclosure category in the checklist by adding the sub-quality scores of all items within the category. A total sub-quality score is also awarded to total corporate environmental disclosure by adding the sub-quality scores of all disclosure categories to derive an aggregate sub-quality score for the company. The maximum applicable total sub-quality scores which a sample company could earn for the highest quality disclosure of 34 items are 102, 68, 68, and 68 for each of Type (comparability), Direction (understandability), Outlook (relevance), and Verifiability (reliability) respectively. Disclosure sub-quality indices are then computed as the percentage of the sub-quality score awarded to maximum applicable sub-quality score. However, overall disclosure quality indices are computed as the arithmetic mean of the four sub-quality indices.

Hence, Total Environmental Disclosure Sub-Quality Index is calculated as the percentage of total sub-quality score awarded to maximum applicable sub-quality score. Similarly, Environmental Disclosure Category Sub-Quality Index is calculated as the percentage of category sub-quality score awarded to maximum applicable category sub-quality score. Collectively, Total Environmental Disclosure Quality Index is calculated as the arithmetic mean of the four sub-quality indices for all disclosure items or categories. Similarly, Environmental Disclosure Category Quality Index is calculated as the arithmetic mean of the four sub-quality indices for the category.

4.7.4.2 Independent Variables

The independent variables of the current study are corporate governance mechanisms of UK listed companies. Corporate governance simply refers to how a corporation is governed. Corporate governance can be defined as the set of processes, customs, policies, laws and institutions affecting the way a corporation is directed, administered or controlled. Corporate governance includes also the relationships among various interested parties and the goals for which the corporation is governed.

Corporate governance mechanisms are classified into the following three groups: (1) Board Characteristics: board independence, role duality, board size, board meetings,

directors' qualifications and experience including education, community influence and cross-directorships; (2) Board Committees Characteristics: the presence of corporate environmental responsibility (CER) committee or responsible, audit committee independence, remuneration committee independence, nomination committee independence; and (3) Ownership Structure: ownership concentration, institutional ownership.

4.7.4.2.1 Board Characteristics

The board of directors plays an important role in corporate governance practices (Bhagat and Bolton, 2008; Haniffa and Cooke, 2002) and this role may be directly linked to companies' environmental attention (Halme and Huse, 1997).Board characteristics expected to impact environmental disclosure and examined in the current study include board independence, role duality, board size, board meetings, directors' qualifications and experience including education, community influence and cross-directorships.

4.7.4.2.1.1 Board Independence

Board independence refers to "the degree to which board members are dependent on the current CEO or organization" (Ayuso and Argandoña, 2007: 5). Independent non-executive directors are outside directors as opposed to either insiders, who are managers or employees of the firm directors, or dependent non-executive directors, who have personal and/or professional relationships with the firm other than board membership (Ayuso and Argandoña, 2007; Pfeffer, 1972; Rupley *et al.*, 2011). Independent non-executive directors are professional managers who are not involved in the direct and daily operations of the company as they are not the company's full-time employees (Chen and Courtenay, 2006; Lim *et al.*, 2007). Their role is to handle company issues involving serious agency problems between managers and shareholders, such as determining executive compensation or senior managers' replacements (Lim *et al.*, 2007). Board independence is measured by the proportion of

independent non-executive directors on the board; that is the number of independent non-executive directors to the total the number of directors on the board.

4.7.4.2.1.2 Role Duality

Role duality means that the chief executive officer (CEO) is also holding the position of Chairperson of the board. Hence, there are dual roles played by the same person (Finkelstein and D' Aveni, 1994). Role duality is measured as a dummy variable with the value of 1 if CEO is also the chairman of the board and 0 otherwise.

4.7.4.2.1.3 Board Size

Board size refers to the number of directors who serve on the board (Zahra and Pearce II , 1989). It is measured by the total number of directors on the board.

4.7.4.2.1.4 Board Meetings

Board Meetings refer to the frequency of meeting occasions organized by board members. Meeting frequency reflects the diligence and vigilance of the board in carrying their duties (Persons, 2006). Board meeting frequency is measured by the total number of meetings held in a year.

4.7.4.2.1.5 Directors' Qualifications And Experience

Directors' qualifications and experience reflect the educational background, values, skills and expertise of directors. Directors' qualifications and experience are defined by the current study as the sum of three factors, namely education, community influence, and cross-directorships of board members.

4.7.4.2.1.5.1 Education

Education can be identified as an institutional consequence influencing accounting systems and practices (Gray, 1988). Accordingly, the educational background of directors can determine their approach to environmental disclosure as reactive or proactive (Peters and Romi, 2011). Education is measured by the proportion of directors on the board with business, accounting, and/or finance educational background; that is the number of directors with business, accounting, and/or finance educational background to the total the number of directors on the board.

4.7.4.2.1.5.2 Community Influence

Community influential directors are defined as directors with experience and linkages who provide support and service to the company in terms of networking and reputation, through connections with various stakeholders, beyond the competitive environment of the firm (Hillman *et al.*, 2000; Mallin and Michelon, 2011; Michelon and Parbonetti, 2010). They provide technical expertise and knowledge in specific areas, expertise on decision making processes, and access to information or prestige. Examples of community influential directors are politicians, academicians, military officers, members of clergy and religious leaders, and members of social or community organizations as well as members of professional bodies (who are affiliated with financial institutions, law firms, advertising agencies, accounting or consulting firms and engineering consultants) and regulators (Baysinger and Zardkoohi, 1986; Hillman *et al.*, 2000) or holding a combination of any of these positions and memberships. They also include those directors retired from or ex-holders of these positions and memberships. Community influence is measured by the proportion of community influential directors on the board; that is the number of directors with community influence to the total the number of directors on the board.

4.7.4.2.1.5.3 Cross-Directorships

Cross-directorships is another aspect of directors' qualifications and experience that exists when directors serve on more than one board. Cross-directorships variable is measured by the proportion of directors on the board with cross-directorships; that is the number of directors with cross-directorships to the total the number of directors on the board.

4.7.4.2.2 Board Committees Characteristics

Board committees are associated with improved corporate governance (Forker 1992; Davis 2001).Board roles and functions are enhanced through the establishment of specialized committees (Zahra and Pearce II, 1989). Board committees characteristics expected to impact environmental disclosure and examined in the current study include the presence of corporate environmental responsibility (CER) committee or responsible, audit committee independence, remuneration committee independence and nomination committee independence.

4.7.4.2.2.1 Corporate Environmental Responsibility (CER) Committee Presence

The presence of a corporate environmental responsibility (CER) committee or a responsible at board level may demonstrate the board's commitment towards environmentally responsible behaviour (Monks and Minow, 1995). Social and environmental responsibility committees help companies in determining and identifying the major societal and environmental concerns that are likely to influence corporate performance (Kohls, 1986). Board CER committee is typically in charge of reviewing CER issues; identifying non-financial risks and monitoring risk management; establishing policies and standards; monitoring compliance with and performance against company CER policies; reviewing company reporting on CER; and overseeing philanthropic activity (Mackenzie, 2007). The presence of a corporate environmental responsibility (CER) committee or a responsible is measured as a

dummy variable with the value of 1 if the company has a board-level CER committee or responsible and 0 otherwise.

4.7.4.2.2.2 Audit Committee Independence

Audit committees are defined as being "responsible for overseeing the financial reporting process and ensuring the objectivity of the external audit" (Uzun *et al.*, 2004: 36). An independent audit committee should help the board to meet its statutory and fiduciary responsibilities (Weir *et al.*, 2002). Following Ayuso and Argandoña (2007: 5) definition of independence, audit committee independence can be defined as "the degree to which board [audit committee] members are dependent on the current CEO or organization". Audit committee independence is measured by the proportion of independent non-executive directors on the audit committee; that is the number of independent non-executive directors to the total the number of directors on the audit committee.

4.7.4.2.2.3 Remuneration Committee Independence

A remuneration committee, also called compensation committee, is responsible to the board for assessing management's performance and recommending appropriate remuneration packages of directors (Nelson *et al.*, 2010; Uzun *et al.*, 2004). Following Ayuso and Argandoña (2007: 5) definition of independence, remuneration committee independence can be defined as "the degree to which board [remuneration committee] members are dependent on the current CEO or organization". Remuneration committee independence is measured by the proportion of independent non-executive directors on the remuneration committee; that is the number of independent non-executive directors to the total the number of directors on the remuneration committee.

4.7.4.2.2.4 Nomination Committee Independence

A nomination committee is suggested as a way to help ensure a formal and transparent procedure for the appointment of new directors to the board. In doing so, nomination committees review gathered information to enable the assessment and selection of candidates for nomination to membership on the board (Carson, 2002; Uzun *et al.*, 2004). Following Ayuso and Argandoña (2007: 5) definition of independence, nomination committee independence can be defined as "the degree to which board [nomination committee] members are dependent on the current CEO or organization". Nomination committee independence is measured by the proportion of independent non-executive directors on the nomination committee; that is the number of independent non-executive directors to the total the number of directors on the nomination committee.

4.7.4.2.3 Ownership Structure

Concentration and type of ownership have been suggested as significant factors in explaining variability in voluntary disclosure practices. Ownership Structure expected to impact environmental disclosure and examined in the current study includes ownership concentration and institutional ownership.

4.7.4.2.3.1 Ownership Concentration

Ownership concentration or a closely held ownership means that the shares of the company are concentrated in the hands of a few large shareholders rather than being widely held by a large number of shareholders each holding a small portion of the company's shares. Ownership concentration or blockholdings is the percentage of ordinary shares held by substantial shareholders. Under the listing rules for the London Stock Exchange firms must, in the report of the directors in their annual report and accounts, disclose the identities behind shareholdings in excess of 3% (Davies *et al.*, 1999). Ownership concentration is measured by the percentage of total shares held by blockholders or shareholdings in excess of 3%.

4.7.4.2.3.2 Institutional Ownership

Institutional investors are organizations which pool large sums of money and invest those sums in securities, real property and other investment assets. Institutional investors include pension funds, mutual funds, investment banks, insurance companies and private firms (Ingley and van der Walt 2004; Mahoney and Roberts, 2007). Institutional ownership is measured by the percentage of total shares held by institutional investors. Companies are only required by London Stock Exchange listing rules to disclose those shareholdings in excess of 3% of company common stock (Davies *et al.*, 1999). Therefore the measure of institutional shareholding used by the current study will not capture the portions of stock held by investors owning less than 3% of company stock.

4.7.4.3 Control Variables

The control variables of the current study are corporate characteristics of UK listed companies. Company characteristics are predominantly considered to be important determinants of corporate environmental disclosure. They act as intervening variables and should be controlled for in empirical investigations (Cowen *et al.*, 1987; Roberts, 1992; Ullmann, 1985). Considerable academic research has investigated the relationship between corporate characteristics and environmental disclosures in companies' annual reports. Prior empirical evidence indicated that corporate characteristics significantly explain the variability in environmental disclosure practices.

The present study's control variables, mostly financial variables, are obtained from *DataStream* database that provides on-line information and computation services to the global securities industry. These control variables include company size, industry, profitability, leverage, liquidity, systematic risk, and cross-listing. They are commonly classified as follows: structure-related variables (company size and leverage); performance-related variables (profitability and liquidity); and market-related variables (industry membership, systematic risk, and cross listing) (Haniffa and Cooke, 2002; Lang and Lundholm, 1993).

4.7.4.3.1 Size

Corporate size has been predominantly associated with corporate environmental disclosure practices. Large companies that can afford additional costs of providing environmental disclosure, tend to employ highly-skilled calibers and expertise and have sophisticated reporting systems to provide comprehensive disclosures (Buzby, 1975; Monteiro and Aibar-Guzman, 2010). Based on agency theory, Jensen and Meckling (1976) pointed out that there is a higher potential for conflict of interest between owners managers in large-size companies and, accordingly, greater agency costs. Therefore, agency theory predicts an increase in environmental disclosure for larger companies as a means of mitigating agency conflicts and reducing agency costs. A stakeholder theory, however, argues that larger companies disclose more information in order to attract capital in financial market (Choi, 1973; Cooke, 1991). Large firms may be especially driven to make environmental disclosures as they have more stakeholders who might be concerned about the company's environmental performance, which is disclosed to them mostly through formal communication channels (Cowen *et al.*, 1987; Trotman and Bradley, 1981). Accordingly, larger companies have greater responsibility to provide information to various stakeholders groups in addressing the wider interests and greater demands of such diverse stakeholders.

Corporate size has consistently been found to have significant and positive association with voluntary disclosure levels in general (Barako *et al.*; 2006; Boesso, and Kumar, 2007; Haniffa and Cooke, 2002) and environmental disclosure in particular (Adams *et al.*, 1998; Brammer and Pavelin, 2008; Cormier *et al.*, 2011; Cormier *et al.*, 2005; Deegan and Gordon, 1996; Gray *et al.*, 2001; Hackston and Milne, 1996; Magness, 2006; Patten, 2002; Peters and Romi, 2011; Rupley *et al.*, 2011; Stanny and Ely, 2008). This relationship is revealed not only in the context of disclosure quantity but also for disclosure quality (Brammer and Pavelin, 2008; Lang and Lundholm, 1993; O'Sullivan *et al.*, 2008; Rupley *et al.*, 2011). Drawing on the theoretical and empirical evidence from prior studies, the current study expects a positive relationship between company size and the quantity and quality of environmental disclosure in the annual reports of UK listed companies.

Different measures of company size have been used in the disclosure literature such as total assets, total sales, capital employed, number of employees, turnover, shareholders' equity and market capitalization. Given that no theoretical justification exists for a particular measure, reviewing the literature reveals that there are no significant differences among the results of studies employing different measures. In addition, it can be observed that total assets is the most popular measure of company size in prior literature (see Brammer and Pavelin, 2008; Gul and Leung, 2004; Haniffa and Cooke, 2002; Ho and Wong, 2001; Monteiro and Aibar-Guzman, 2010; Peters and Romi, 2011; Rupley *et al.*, 2011). Therefore, corporate size is measured in the current study using the natural logarithm of total assets.

4.7.4.3.2 Industry

Industry nature is commonly proposed as a significant firm-level driver of corporate environmental disclosure practices. A stakeholder theory, however, argues that companies operating in environmentally-sensitive industries or high profile industries are more likely to disclose information about their environmental performance. Environmentally-sensitive companies are likely to disclose more environmental information to reflect sensitivity to their particular problems (Cowen *et al.*, 1987; Neu *et al.* 1998; Patten, 2002). In addition, industrial sensitivity towards the environment intensifies stakeholders' requests for corporate environmental information as a means of addressing their environmental concerns. Industries identified by prior literature to be of high environmental sensitivity include oil and gas, chemicals, construction and building materials, mining, forestry and paper, and utilities (Cormier and Magnan, 2007; Wilmshurst and Frost, 2000).

Empirical evidence on the relationship between the nature of industry and the level and quality of environmental disclosure is mixed. A considerable number of studies reported evidence of a significant positive association between environmental disclosure and industry sensitivity (Adams *et al.*, 1998; Brammer and Pavelin, 2008; Campbell, 2004; Cormier *et al.*, 2005; Deegan and Gordon, 1996; García-Ayuso and Larrinaga, 2003; Gray *et al.*, 2001; Hackston and Milne, 1996; Halme and Huse, 1997). However, other studies were unable to confirm a significant association

between environmental disclosure and industry type (Cooper and Zainudin, 2009; Stanny and Ely, 2008). Drawing on the theoretical and empirical evidence from prior studies, the current study expects a positive relationship between industry sensitivity and the quantity and quality of environmental disclosure in the annual reports of UK listed companies.

Industry is commonly measured in the disclosure literature as a dummy variable according to companies' degree of environmental sensitivity, where companies are categorized as being of high sensitivity or low sensitivity (see Campbell, 2004; Cooper and Zainudin, 2009; Cowen *et al.*, 1987; Deegan and Gordon, 1996; Reverte, 2009). Alternatively, classification is made according to industries intuitive appeal; those industries with consumer visibility, a high level of political risk and intense competition, where companies are categorized as being of high profile or low profile (see Roberts, 1992). Sometimes, however, distinction is made between manufacturing companies and non manufacturing companies (see Ho and Taylor, 2007; Lim *et al.*, 2007). Nevertheless, some studies examined the effect of each industrial sector on disclosure decisions (see Brammer and Pavelin, 2008; Haniffa and Cooke, 2002; Michelon and Parbonetti, 2010; Peters and Romi, 2011). Although the manufacturing-non manufacturing classification is arguably very simple to produce specific associations, the individual sector classification may be too complex in terms of interpreting the results (Cooper and Zainudin, 2009). Accordingly, industry is measured in the current study as a dummy variable with the value of 1 if the company belongs to an environmentally sensitive industry and 0 otherwise.

4.7.4.3.3 Profitability

Profitability is commonly cited as a factor influencing social and environmental disclosure. However, profitability has inconclusive relationship to environmental disclosure. A plausible explanation for a positive association is that management has the flexibility to undertake and disclose extensive environmental responsibility activities to stakeholders (Heinze, 1976). Based on agency theory, managers in profitable companies can use disclosure to handle the information asymmetry problem and to maintain their positions and compensation (Giner, 1997; Singhvi, 1968) and,

hence, the assumption that more profitable companies are more likely to provide enhanced disclosure. Similarly, stakeholder theory argues that profitability is the motive to disclose environmental information (Gray *et al.*, 1995a) and predicts a positive association between accounting-based measures of financial performance and corporate social and environmental disclosure (Roberts, 1992). High profitable companies induce management to disclose more information in order to distinguish themselves from less profitable companies as a means of attracting investors and raising capital (Singhvi and Desai, 1971), where enhanced financial performance strongly influences the level of support management can commit to social and environmental responsibility activities (Ullmann, 1985). In addition, s environmentally responsive firms are expected to be more profitable as they should possess the same requisite skills to run a company profitably (Belkaoui and Karpik, 1989). On the other hand, low profitable companies avoid disclosing more information to conceal their poor performance, given that during periods of low profitability stakeholders' economic demands take priority over voluntary social and environmental interests (Ullman, 1985).

Empirically, evidence of the relationship between profitability and environmental disclosure is quite mixed. On one hand, a significant positive relationship between the two variables is documented by Cooper and Zainudin (2009), Haniffa and Cooke (2005) and Neu *et al.* (1998). On the other hand, a significant negative relationship between firm profitability and environmental disclosure is found by Ho and Taylor (2007). Nevertheless, some prior studies indicated no significant association between environmental disclosures and profitability (Brammer and Pavelin, 2008; García-Sánchez, 2008; Hackston and Milne, 1996; Michelon and Parbonetti, 2010; Peters and Romi, 2011; Stanny and Ely, 2008). Drawing on the above theoretical evidence, the current study expects a positive relationship between profitability and the quantity and quality of environmental disclosure in the annual reports of UK listed companies.

Two types of profitability measures have been used in the disclosure literature: accounting-based measures such as return on assets, return on equity, earnings before interest and taxes, and market-based measures such as stock-market returns. In the context of accounting disclosure, accounting-based measure are more preferable as market-based measures reflect investors' evaluations of company performance, thus

ignoring other important stakeholder groups (McGuire *et al.*, 1988; Reverte, 2009). A commonly employed measure of profitability is return on assets (ROA) (see Belkaoui and Karpik, 1989; Brammer and Pavelin, 2008; Cormier *et al.*, 2011; Cormier *et al.*, 2010; Lim *et al.*, 2007; Patten, 1991; Peters and Romi, 2011). Accordingly, profitability is measured in the current study using the natural logarithm of return on assets.

4.7.4.3.4 Leverage

Leverage has been suggested as a possible explanatory variable of environmental disclosure practices. It represents a company's ability to meet its obligations. Agency theory predicts a positive relationship between leverage and disclosure. It argues that highly leveraged companies incur more monitoring costs (Jensen and Meckling, 1976) and may, therefore, disclose more information to reduce these agency costs (Ahmed and Courtis, 1999). From a stakeholder perspective, however, there is an expectation that highly-leveraged companies will disclose more information in their annual reports as a means of enhancing their chance of raising funds from financial institutions (Ahmed and Nicholls, 1994; Barako *et al.*, 2006).

Empirical findings on the relationship between leverage and environmental disclosure are inconclusive. While some studies found a significant positive association between leverage and environmental disclosure (e.g. Clarkson *et al.*, 2008; Naser *et al.*, 2006; Parsa and Kouhy, 2008) other studies found a significant negative association (e,g. Belkaoui and Karpik, 1989; Brammer and Pavelin, 2006; Cooper and Zainudin, 2009; Cormier *et al.*, 2011; Cormier and Magnan, 2003). Nevertheless, other studies were unable to confirm any significant association between leverage and environmental disclosure (see Al Arussi *et al.*, 2009; Branco and Rodrigues, 2008; Cormier *et al.*, 2005; Ho and Taylor, 2007; Haniffa and Cooke 2005; Michelon and Parbonetti, 2010; Peters and Romi, 2011; Reverte, 2009; Stanny and Ely, 2008).

Drawing on the above theoretical evidence, the current study expects a positive relationship between leverage and the quantity and quality of environmental disclosure in the annual reports of UK listed companies. Leverage has been measured

in the disclosure literature using the ratio of debt to assets, the ratio of debt to shareholders equity or the ratio of debt to standard capital employed. The ratio of debt to assets is commonly used in prior studies (see Al Arussi *et al.*, 2009; Barako *et al.*, 2006; Brammer and Pavelin, 2006; Clarkson *et al.*, 2008; Cormier *et al.*, 2011; Cormier *et al.*, 2010; Haniffa and Cooke 2002; Huafang and Jianguo, 2007; O'Sullivan *et al.*, 2008; Peters and Romi, 2011). Accordingly, leverage is measured in the current study as the ratio of total debt to total assets.

4.7.4.3.5 Liquidity

Liquidity has been proposed as a firm-level explanatory variable of environmental disclosure practices. It is argued that the soundness of the firm as being evaluated in terms of high liquidity is associated with greater levels of disclosure (Cooke, 1989). From a stakeholder-agency perspective, managers may be motivated to disclose more information about the company's liquidity in order to satisfy the needs of various stakeholders, particularly, shareholders and creditors. Wallace and Naser (1995) argued that regulatory institutions, investors and creditors are concerned with the going concern status of companies. This brings an expectation that highly-liquid companies would release more information to demonstrate the company's ability to cover its obligations as they come due (Barako *et al.*, 2006).

Empirical evidence on the relationship between liquidity and corporate environmental disclosure are quit limited. Ho and Taylor (2007) found a significant negative association. However, in the context of voluntary disclosure, Gul and Leung (2004) documented significant negative relationship between liquidity and voluntary disclosure, while Barako *et al.* (2006) were unable to confirm any significant association between the two variables. In an even wider context of corporate disclosure in general, Camfferman and Cooke (2002) found a significant positive association between liquidity and disclosure in the annual reports of UK and Dutch companies.

Drawing on the above theoretical evidence, the current study expects a positive relationship between liquidity and the quantity and quality of environmental

disclosure in the annual reports of UK listed companies. A company's liquidity has been predominantly measured in the disclosure literature using the current ratio (see Barako *et al.*, 2006; Camfferman and Cooke, 2002). Accordingly, liquidity is measured in the current study using the current ratio, defined as current assets to current liabilities.

4.7.4.3.6 Systematic Risk

Systematic risk can be a significant driver of environmental disclosure practices. Environmental risk assessments are now a key part of credit risk analyses (Cormier *et al.*, 2005). Consistent with an agency perspective, additional environmental disclosure help investors in high risk companies to reduce their information asymmetries and, hence reduce the costs of private information acquisition (Lang and Lundholm, 1993), thereby increasing firm value to investor. A stakeholder theory argues that high level of systematic risk makes it more difficult for investors to precisely assess a firm's value (Cormier *et al.*, 2005; Foster, 1986) and therefore companies are expected to voluntary disclose more information to satisfy stakeholders' needs. In addition, companies with high systematic risk may disclose social and environmental information as a means of reducing this risk (Trotman and Bradley, 1981).

Empirical evidence on the relationship between systematic risk and environmental disclosure is inconclusive. On the one hand, Trotman and Bradley (1981) documented that companies which provide social and environmental responsibility information have a higher systematic risk. Importantly, Cormier *et al.*, 2005 found that information costs, as proxied by risk, are potentially important determinants of environmental disclosure quality. On the other hand, Belkaoui and Karpik (1989) and Roberts (1992) found significant negative relationship between the level of corporate social and environmental disclosure and systematic risk. In a similar vein, Cormier *et al.* (2011) indirectly deduced a significant negative association of risk with environmental disclosure by revealing a positive association with information asymmetry. Nevertheless, García-Ayuso and Larrinaga (2003) and Michelon and Parbonetti (2010) were unable to confirm any significant association between systematic risk and environmental disclosure.

Drawing on the above theoretical evidence, the current study expects a positive relationship between systematic risk and the quantity and quality of environmental disclosure in the annual reports of UK listed companies. One of the most popular indicators of risk is a statistical measure called beta. Beta is a measure of a stock's volatility in relation to the market. This measure is extensively used in the disclosure literature to measure a company's risk (Cormier *et al.*, 2011; Cormier *et al.*, 2005; Michelon and Parbonetti, 2010; Roberts, 1992; Trotman and Bradley, 1981). Accordingly, beta is used to measure systematic risk in the current study.

4.7.4.3.7 Cross-Listing

Cross-listing means that companies are listed on multiple stock exchanges, mostly internationally. Cross-listing is suggested as an important factor in explaining the variation in environmental disclosure practices. Grüning (2007) indicates that listing status can be identified as the key element in understanding the network of related drivers of corporate disclosure. When listed internationally companies have to adhere to the national regulations of stock exchanges in each of the listing countries. Disclosure quality in annual reports is greatly influenced by the listing rules and requirements of stock exchanges (Singhvi and Desai, 1971). Hence cross-listed companies may provide extensive disclosures to fulfill such international challenges as compared to nationally-listed companies (Cooke, 1989; Gray *et al.*, 1995d). In addition, Haniffa and Cooke (2005) argue that such multiple-listed companies would disclose a great deal of social and environmental information, especially if listed in developed countries. Accordingly, and in line with agency theory, disclosure can limit the monitoring and agency costs resulting from the existence of a greater number of shareholders (Reverte, 2009). Consistent with a stakeholder perspective, however, companies listed on multiple stock exchanges have to respond to and address the needs and expectations of tremendously increasing and diverse stakeholder groups by disseminating comprehensive and high-quality information through enhanced corporate disclosure. Therefore, both agency theory and stakeholder theory predict a positive relationship between disclosure and listing status.

The majority of prior empirical studies provide evidence of a significant positive association between listing status and environmental disclosure (see Haniffa and Cooke, 2005; Peters and Romi, 2011; Reverte, 2009), although Michelon and Parbonetti (2010) were unable to detect the significance of such relationship. Drawing on the theoretical and empirical evidence from prior studies, the current study expects a positive relationship between cross-listing and the quantity and quality of environmental disclosure in the annual reports of UK listed companies.

Cross-listing is commonly measured in the disclosure literature as a dummy variable according to whether or not companies have multiple listings either domestically or both domestically and internationally (see Haniffa and Cooke, 2005; Michelon and Parbonetti, 2010; Peters and Romi, 2011), although some studies limit the measure to listing on one or more of the top stock exchanges as measured by market capitalization (see Cormier *et al.*, 2010; Peters and Romi, 2011). Other prior studies used the number of foreign stock markets (e.g Reverte, 2009) or the number of countries (e.g Grüning, 2007) in which a company is listed. Accordingly, cross-listing is measured in the current study as a dummy variable with the value of 1 if the company is listed on multiple stock exchanges and 0 otherwise.

Table 4.5 provides a summary of the operational definition or measurement of each of the dependent variables, the independent variables and the control variables, along with their data sources. The dependent variables, corporate environmental disclosure quantity and quality, are obtained by content analysizing annual reports. The independent variables, corporate governance variables, are sourced from annual reports. An exception is ownership structure variables, where ownership data concerning ownership concentration and institutional ownership are extracted from the 2004-2007 London Stock Exchange Yearbooks. The control variables, mostly financial variables, are obtained from *DataStream* database that provides on-line information and computation services to the global securities industry.

Table 4.5

Operational definitions of variables

Variable	Operational Definition	Data Source
Dependent variables		
Total Corporate Environmental Disclosure Quantity	Percentage of total quantity score awarded to maximum applicable quantity score	Company annual report
Corporate Environmental Disclosure Category Quantity	Percentage of category quantity score awarded to maximum applicable category quantity score	Company annual report
Total Corporate Environmental Disclosure Quality	Percentage of total quality score awarded to maximum applicable quality score	Company annual report
Corporate Environmental Disclosure Category Quality	Percentage of category quality score awarded to maximum applicable category quality score	Company annual report
Independent variables		
Board Independence	Proportion of independent non-executive directors on the board	Company annual report
Role Duality	Dummy variable equal to 1 if CEO is also chairman, 0 otherwise	Company annual report
Board Size	Total number of directors on the board	Company annual report
Board Meetings	Total number of board meetings per year	Company annual report
Education	Proportion of directors on the board with business and/or accounting background	Company annual report
Community Influence	Proportion of directors on the board with community influence	Company annual report
Cross-Directorships	Proportion of directors on the board with cross directorship	Company annual report

Variable	Operational Definition	Data Source
CER Committee Presence	Dummy variable equal to 1 if the company has a board-level CER committee or responsible, 0 otherwise	Company annual report
Audit Committee Independence	Proportion of independent non-executive directors on audit committee	Company annual report
Remuneration Committee Independence	Proportion of independent non-executive directors on remuneration committee	Company annual report
Nomination Committee Independence	Proportion of independent non-executive directors on nomination committee	Company annual report
Ownership Structure	Percentage of total shares held by blockholders or shareholders in excess of 3%	London Stock Exchange Yearbook
Institutional Ownership	Percentage of total shares held by institutional investors	London Stock Exchange Yearbook
Control variables		
Size	Natural logarithm of total assets	*DataStream* database
Industry	Dummy variable equal to 1 if the company belongs to an environmentally sensitive industry, 0 otherwise	*DataStream* database
Profitability	Natural logarithm of return on assets	*DataStream* database
Leverage	Ratio of total debt to total assets	*DataStream* database
Liquidity	Current ratio	*DataStream* database
Systematic Risk	Beta	*DataStream* database
Cross-Listing	Dummy variable equals to 1 if the company is listed on multiple stock exchanges, 0 otherwise	*DataStream* database

4.7.5 Model Specification

The following four models are developed to help measure the total quantity of corporate environmental disclosure and the quantity of corporate environmental disclosure in each disclosure category as well as the total quality of corporate environmental disclosure and the quality of corporate environmental disclosure in each disclosure category.

Model 1

$$\begin{aligned}CEDQUAN = {} & ß_0 + ß_1\ B\_IND + ß_2\ R\_DUAL + ß_3\ B\_SIZE + ß_4\ B\_MEET + \\ & ß_5\ D\_EDU + ß_6\ D\_COMINF + ß_7\ D\_CROSSDIR + \\ & ß_8\ CER\_COM + ß_9\ AUD\_COM + ß_{10}\ REM\_COM + \\ & ß_{11}\ NOM\_COM + ß_{12}\ OWN\_CONC + ß_{13}\ INST\_OWN + \\ & ß_{14}\ SIZE + ß_{15}\ INDUSTRY + ß_{16}\ PROFIT + ß_{17}\ LEVERAGE + \\ & ß_{18}\ LIQUIDITY + ß_{19}\ BETA + ß_{20}\ LISTING + Є\end{aligned}$$

Model 2

$$\begin{aligned}CEDQUANC = {} & ß_0 + ß_1\ B\_IND + ß_2\ R\_DUAL + ß_3\ B\_SIZE + ß_4\ B\_MEET + \\ & ß_5\ D\_EDU + ß_6\ D\_COMINF + ß_7\ D\_CROSSDIR + \\ & ß_8\ CER\_COM + ß_9\ AUD\_COM + ß_{10}\ REM\_COM + \\ & ß_{11}\ NOM\_COM + ß_{12}\ OWN\_CONC + ß_{13}\ INST\_OWN + \\ & ß_{14}\ SIZE + ß_{15}\ INDUSTRY + ß_{16}\ PROFIT + ß_{17}\ LEVERAGE + \\ & ß_{18}\ LIQUIDITY + ß_{19}\ BETA + ß_{20}\ LISTING + Є\end{aligned}$$

Model 3

$$CEDQUAL = ß_0 + ß_1\ B\_IND + ß_2\ R\_DUAL + ß_3\ B\_SIZE + ß_4\ B\_MEET + ß_5\ D\_EDU + ß_6\ D\_COMINF + ß_7\ D\_CROSSDIR + ß_8\ CER\_COM + ß_9\ AUD\_COM + ß_{10}\ REM\_COM + ß_{11}\ NOM\_COM + ß_{12}\ OWN\_CONC + ß_{13}\ INST\_OWN + ß_{14}\ SIZE + ß_{15}\ INDUSTRY + ß_{16}\ PROFIT + ß_{17}\ LEVERAGE + ß_{18}\ LIQUIDITY + ß_{19}\ BETA + ß_{20}\ LISTING + Є$$

Model 4

$$CEDQUALC = ß_0 + ß_1\ B\_IND + ß_2\ R\_DUAL + ß_3\ B\_SIZE + ß_4\ B\_MEET + ß_5\ D\_EDU + ß_6\ D\_COMINF + ß_7\ D\_CROSSDIR + ß_8\ CER\_COM + ß_9\ AUD\_COM + ß_{10}\ REM\_COM + ß_{11}\ NOM\_COM + ß_{12}\ OWN\_CONC + ß_{13}\ INST\_OWN + ß_{14}\ SIZE + ß_{15}\ INDUSTRY + ß_{16}\ PROFIT + ß_{17}\ LEVERAGE + ß_{18}\ LIQUIDITY + ß_{19}\ BETA + ß_{20}\ LISTING + Є$$

Where :

CEDQUAN = Total Corporate Environmental Disclosure Quantity;

CEDQUANC = Corporate Environmental Disclosure Category Quantity;

CEDQUAL = Total Corporate Environmental Disclosure Quality;

CEDQUALC = Corporate Environmental Disclosure Category Quality;

$ß_0$ = Intercept;

$ß_1$ to $ß_{20}$ = Coefficient of slope parameters;

$Є$ = Error term;

B_IND = Board Independence;

R_DUAL = Role Duality;

B_SIZE = Board Size;

B_MEET = Board Meetings;

D_EDU = Education;

D_COMINF = Community Influence;

D_CROSSDIR = Cross-Directorship;

CER_COM = Corporate Environmental Responsibility Committee (CER);

AUD_COM = Audit Committee Independence;

REM_COM = Remuneration Committee Independence;

NOM_COM = Nomination Committee Independence;

OWN_CONC = Ownership Concentration;

INST_OWN = Institutional Ownership;

SIZE = Firm Size;

INDUSTRY = Industry;

PROFIT = Profitability;

LEVERAGE = Leverage;

LIQUIDITY = Liquidity;

BETA = Systematic risk;

LIST = Cross-Listing.

4.7.6 Econometric Model Statistical Tests

The statistical package, STATA 11, is used for performing the statistical analyses including descriptive statistics, Pearson and Spearman correlations and Ordinary Least Squares (OLS) multiple regression tests. In addition, GLS regression is undertaken to further test the research hypotheses and to attest the reliability of the main OLS regression results. Finally, sensitivity analysis using Ordinary Least Squares (OLS) pooled regression with robust standard error is carried out to check the sensitivity and, hence, the robustness of the main regression analysis.

Descriptive statistics of the data gathered are calculated for each of the dependent, independent and control variables. Pearson and Spearman correlations analyses are carried out to identify the correlation between the dependent and independent variables. Correlation coefficients are used as a check for multicolinearity, in addition to Variance Inflation Factor (VIF) test. They are also intended to attest the validity of the research instrument. Ordinary Least Squares (OLS) cross sectional panel regression analysis is undertaken to identify the association between corporate environmental disclosure and corporate governance, while controlling for corporate characteristics. Four models are tested in which the dependent variables are total corporate environmental disclosure quantity, corporate environmental disclosure quantity in each disclosure category, total corporate environmental disclosure quality and corporate environmental disclosure quality in each disclosure category. The independent variables are corporate governance mechanisms and the control variables are corporate characteristics. Data are paneled according to time or the four years examined; 2004-2007 inclusive. Panel data are better able to identify and measure effects that are simply not detectable in pure cross-section or pure time-series data.

Research hypotheses are mainly examined using OLS. However, GLS regression is undertaken to further test the research hypotheses and to attest the reliability of the main OLS regression results. In addition, a pooled ordinary least square (OLS) regression is applied in comparison to the panel regression as it deals with the whole observations as one unit with the same intercept and same error distribution. The standard error robust regression test would be used as the data are not normally distributed. The data are analyzed at confidence levels of 99%, 95%, and 90%.

4.8 CONCLUSION

This chapter articulates the methodology employed by the present study based on the purpose and objectives of the study. Based on stakeholder-agency theory, the main objectives of the present study is to empirically examine the relationship between corporate governance mechanisms and the quantity and quality of corporate environmental disclosure practices in UK companies' annual reports and to provide an in-depth investigation of environmental disclosure quality identification and assessment. To fulfill these research objectives, the current study adopts an objective methodological position of philosophical assumptions.

Ontologically, the current study adopts a realism position. Epistemologically, the study takes a positivism position. Regarding the human nature assumptions, the current study assumes determinism. Accordingly, human beings are mainly considered as conditioned by their external circumstances. In this regard, the current research seeks objectively measurable and observable human behaviour. These philosophical assumptions imply that the study is inclined towards an objective nomothetic methodology, where quantitative research methods are made use of. Therefore, the study seeks a quantitatively measured description and exploration of the perceived reality of environmental disclosure and corporate governance.

It is also argued that the interpretive-functionalist transition zone is the appropriate research paradigm that fits with the objective research philosophy and methodological position adopted by the current study. Therefore, the deductive approach, also referred to as the hypothetico-deductive approach, is considered to be more suitable to the present study. Using the survey strategy and employing quantitative methods, the research seeks to gather the required data based on a longitudinal time horizon, using the research technique of content analysis.

Consequently, the current study would include two different, but complementary, quantitative empirical research analyses. The differentiation is based on the phenomenon being analyzed for achieving the research objectives. First, quantitative analysis, using content analysis of a sample of UK companies' annual reports, will be undertaken to examine the quantity of corporate environmental disclosure practices and their association with corporate governance mechanisms, over a period of four

years. Second, quantitative analysis, using content analysis of a sample of UK companies' annual reports, will be undertaken to examine the quality of corporate environmental disclosure practices and their association with corporate governance mechanisms, over a period of four years.

Finally, research design provides a description of the research methods employed, while providing substantiation for using the content analysis method in undertaking the research. The impact of corporate governance on the quantity and quality of corporate environmental disclosure is examined using content analysis method. The annual reports of FTSE-All share companies are examined for years 2004-2007 inclusive. A checklist of environmental disclosure items and categories is developed and environmental disclosure indices are computed. In doing so, the study distinguishes between the different categories or areas of activity to which environmental disclosure relates as well as between the different types of environmental information content.

The research methodology serves as a link between the theoretical perspective and the empirical analysis of the research. Based on the adopted theoretical framework, the selected methodology portrays the sequential stages through which the empirical analysis will progress in the following chapters. In this respect, the next two chapters are devoted to empirically examining the relationship between corporate governance mechanisms and the quantity of corporate environmental disclosure, as well as examining the relationship between corporate governance mechanisms and the quality of corporate environmental disclosure, along with investigating environmental disclosure quality identification and assessment issues.

Chapter 5

EXAMINING THE RELATIONSHIP BETWEEN ENVIRONMENTAL DISCLOSURE QUANTITY AND CORPORATE GOVERNANCE

CHAPTER FIVE

EXAMINING THE RELATIONSHIP BETWEEN ENVIRONMENTAL DISCLOSURE QUANTITY AND CORPORATE GOVERNANCE

5.1 INTRODUCTION

Determining the research methodology, deciding on the relevant philosophical assumptions and methodological choices, and constructing the appropriate research design, portray the necessary steps for proceeding in the empirical study. Based on stakeholder-agency theory, the main objectives of the present study is to empirically examine the relationship between corporate governance mechanisms and the quantity and quality of corporate environmental disclosure practices in UK companies' annual reports and to provide an in-depth investigation of environmental disclosure quality identification and assessment.

This chapter constitutes the first part of the empirical work aimed at quantitatively investigating the relationship between corporate governance mechanisms and the quantity of corporate environmental disclosure practices in UK companies' annual reports. It commences with carrying out some descriptive analyses of the variables of interest to measure the quantity of corporate environmental disclosure practices in the annual reports and its trend over time. Moreover, correlation analyses are undertaken to detect any autocorrelations among variables. Correlation coefficients are also intended to attest the construct validity of the disclosure measurement. Using regression analysis, the chapter proceeds with testing the hypotheses developed for examining the relationship in question, while controlling for corporate characteristics. Two models are tested in which the dependent variables are total corporate environmental disclosure quantity and the quantity of disclosure within each disclosure category. Finally, sensitivity analysis is carried out to check the robustness of the main regression analysis. Results are discussed and analyzed in terms of the theoretical framework adopted and conclusions are drawn from statistical findings.

5.2 EXAMINING THE EXTENT AND TREND OF CORPORATE ENVIRONMENTAL DISCLOSURE QUANTITY

Corporate environmental disclosure quantity indices provide a measure of the extent of total environmental disclosure as well as environmental disclosure within each disclosure category. These indices are computed for the four years of the study to provide the trend in environmental disclosure practices in the annual reports over time. Descriptive statistics are performed to help carry out the required analyses. Data are panelled by year, along with data pooling in order to permit thorough analysis of total corporate environmental disclosure and each corporate environmental disclosure category. The results of the descriptive statistics for each of the yearly panels as well as the pooled environmental disclosure quantity are shown in the following tables.

Table 5.1

Descriptive Statistics Of Environmental Disclosure Quantity Panel A: 2004

Variable	Mean (Median)	Standard Deviation	Min. (Max.)	Standard Skewness	Standard Kurtosis
Total Environmental Disclosure	32.47 (32.35)	14.91	0.00 (70.59)	-0.15	2.66
Environmental Policies	34.14 (33.33)	15.38	0.00 (75.00)	0.05	3.13
Product and Process-Related Environmental Issues	34.22 (37.50)	22.83	0.00 (100.00)	0.22	2.46
Compliance with Environmental Laws and Standards	35.26 (25.00)	28.74	0.00 (100.00)	0.37	2.09
Environmental Auditing	83.41 (100.00)	37.28	0.00 (100.00)	-1.80	4.23
Sustainability	27.73 (0.00)	30.45	0.00 (100.00)	0.61	2.43
Other Environmentally-Related Information	19.84 (14.29)	15.61	0.00 (71.43)	0.50	2.76

Table 5.1 shows the descriptive statistics of total environmental disclosure quantity and the quantity of environmental disclosure within each of the disclosure categories for the first panel of data for the year 2004. The overall environmental disclosure quantity level represents 32.47% of the examined checklist items, which varies between 0% and 70.59% for the lowest and highest UK companies disclosures respectively. Moreover, environmental auditing disclosure represents the highest disclosure quantity level of 83.41%, while other environmentally-related information disclosure represents the lowest disclosure quantity level of 19.84%. This indicates that environmental auditing is a dominant category of environmental disclosure that most companies in the examined sample agree to disclose.

In addition, statistics reveal that the maximum disclosure quantity of 100% is presented by product and process-related environmental issues, compliance with environmental laws and standards, environmental auditing and sustainability. However, for all disclosure categories, the minimum disclosure quantity is 0%, which means that at least one of the sample companies missed at least one of these environmental disclosure categories.

The descriptive statistics show the normality of environmental disclosure data. It is observed that sustainability represents the maximum standard skewness of 0.61, while the environmental auditing shows the minimum standard skewness of -1.80. This indicates that the minimum and maximum skewness are within the normally distributed range of ±1.96 (Haniffa and Hudaib, 2006). However, the data are considered to be normally distributed if the standard kurtosis statistics fall within the range of ±3 (Haniffa and Hudaib, 2006). Accordingly, in terms of the standard kurtosis statistics, environmental disclosure data are not normally distributed. Particularly, the disclosure categories of environmental policies and environmental auditing exceed the range of ±3 indicating that such data are not normally distributed. As a consequence, a robust analysis is necessary for any hypotheses test related to the entire data.

Table 5.2

Descriptive Statistics Of Environmental Disclosure Quantity Panel B: 2005

Variable	Mean (Median)	Standard Deviation	Min. (Max.)	Standard Skewness	Standard Kurtosis
Total Environmental Disclosure	35.92 (35.29)	13.69	0.00 (76.47)	-0.01	3.08
Environmental Policies	36.72 (33.33)	14.11	0.00 (83.33)	0.22	3.60
Product and Process-Related Environmental Issues	38.21 (37.50)	21.69	0.00 (100.00)	0.01	2.44
Compliance with Environmental Laws and Standards	42.47 (50.00)	30.27	0.00 (100.00)	0.13	1.98
Environmental Auditing	89.08 (100.00)	31.25	0.00 (100.00)	-2.51	7.28
Sustainability	30.79 (50.00)	31.10	0.00 (100.00)	0.49	2.35
Other Environmentally-Related Information	22.09 (14.29)	15.85	0.00 (71.43)	0.44	2.77

Table 5.2 presents the descriptive statistics of total environmental disclosure quantity and the quantity of environmental disclosure within each of the disclosure categories for the second panel of data for the year 2005. The results indicate that the mean total environmental disclosure quantity level is 35.92%, which is slightly higher than previous year's level. Moreover, environmental auditing disclosure represents the highest disclosure quantity level of 89.08%, while other environmentally-related information disclosure represents the lowest disclosure quantity level of 22.09%.

Regarding the standard skewness statistics, the presented data are not normally distributed. It is observed that the standard skewness of environmental auditing disclosure is -2.51 which exceeds the range of ±1.96 evidencing the normality of the data (see Haniffa and Hudaib, 2006). This result is confirmed by the standard kurtosis

statistics, where the standard kurtosis of total environmental disclosure as well as that of each of environmental policies and environmental auditing disclosure categories exceed the normality range of ±3 (see Haniffa and Hudaib, 2006), indicating that such data are not normally distributed.

Table 5.3

Descriptive Statistics Of Environmental Disclosure Quantity Panel C: 2006

Variable	Mean (Median)	Standard Deviation	Min. (Max.)	Standard Skewness	Standard Kurtosis
Total Environmental Disclosure	40.35 (41.18)	13.56	0.00 (70.59)	-0.29	3.05
Environmental Policies	40.21 (41.67)	14.12	0.00 (83.33)	0.07	3.22
Product and Process-Related Environmental Issues	44.05 (50.00)	21.64	0.00 (100.00)	-0.21	2.49
Compliance with Environmental Laws and Standards	50.98 (50.00)	30.29	0.00 (100.00)	-0.09	2.09
Environmental Auditing	91.70 (100.00)	27.64	0.00 (100.00)	-3.02	10.14
Sustainability	35.15 (50.00)	32.07	0.00 (100.00)	0.36	2.30
Other Environmentally-Related Information	24.46 (28.57)	15.74	0.00 (71.43)	0.33	2.64

Table 5.3 shows the descriptive statistics of total environmental disclosure quantity and the quantity of environmental disclosure within each of the disclosure categories for the third panel of data for the year 2006. The overall environmental disclosure quantity level represents 40.35% of the examined checklist items, which is higher than the level of the previous two years. Moreover, environmental auditing disclosure represents the highest disclosure quantity level of 91.70%, while other

environmentally-related information disclosure represents the lowest disclosure quantity level of 24.46%.

Regarding the standard skewness statistics, the presented data are not normally distributed. It is observed that the standard skewness of environmental auditing disclosure is -3.02 which exceeds the range of ±1.96 evidencing the normality of the data (see Haniffa and Hudaib, 2006). This result is confirmed by the standard kurtosis statistics, where the standard kurtosis for total environmental disclosure as well as for each of environmental policies and environmental auditing disclosure categories exceed the normality range of ±3 (see Haniffa and Hudaib, 2006), indicating that such data are not normally distributed. As a consequence, a robust analysis is necessary for any hypotheses test related to the entire data.

Table 5.4

Descriptive Statistics Of Environmental Disclosure Quantity Panel D: 2007

Variable	Mean (Median)	Standard Deviation	Min. (Max.)	Standard Skewness	Standard Kurtosis
Total Environmental Disclosure	45.03 (47.06)	13.90	2.94 (76.47)	-0.28	2.73
Environmental Policies	44.25 (41.67)	14.44	0.00 (91.67)	0.21	3.19
Product and Process-Related Environmental Issues	50.22 (50.00)	20.71	0.00 (100.00)	-0.26	2.73
Compliance with Environmental Laws and Standards	55.24 (50.00)	29.34	0.00 (100.00)	-0.17	2.10
Environmental Auditing	92.58 (100.00)	26.27	0.00 (100.00)	-3.25	11.55
Sustainability	46.07 (50.00)	31.86	0.00 (100.00)	0.07	2.45
Other Environmentally-Related Information	27.51 (28.57)	16.21	0.00 (71.43)	0.22	2.47

Table 5.4 presents the descriptive statistics of total environmental disclosure quantity and the quantity of environmental disclosure within each of the disclosure categories for the fourth panel of data for the year 2007. The results show that the mean total environmental disclosure quantity level is 45.03% of the examined checklist items, which varies between 2.94% and 76.47% for the lowest and highest UK companies disclosures respectively. This disclosure level is higher than the level of the previous three years, indicating an increased awareness of corporate environmental responsibility. Moreover, environmental auditing disclosure represents the highest disclosure quantity level of 92.58%, while other environmentally-related information disclosure represents the lowest disclosure quantity level of 27.51%. This indicates that environmental auditing is a dominant category of environmental disclosure that most companies in the examined sample agree to disclose.

In addition, statistics reveal that the maximum disclosure quantity of 100% is presented by product and process-related environmental issues, compliance with environmental laws and standards, environmental auditing and sustainability. However, for all disclosure categories, the minimum disclosure quantity is 0%, which means that at least one of the sample companies missed at least one of these environmental disclosure categories.

Regarding the standard skewness statistics, the presented data are not normally distributed. It is observed that the standard skewness of environmental auditing disclosure is -3.25 which exceeds the range of ±1.96 evidencing the normality of the data (see Haniffa and Hudaib, 2006). However, the data are considered to be normally distributed if the standard kurtosis statistics fall within the range of ±3 (Haniffa and Hudaib, 2006). Accordingly, in terms of the standard kurtosis statistics, environmental disclosure data are not normally distributed. Particularly, the disclosure categories of environmental policies and environmental auditing exceed the range of ±3 indicating that such data are not normally distributed. As a consequence, a robust analysis is necessary for any hypotheses test related to the entire data.

Table 5.5

Descriptive Statistics Of Pooled Environmental Disclosure Quantity

Variable	Mean (Median)	Standard Deviation	Min. (Max.)	Standard Skewness	Standard Kurtosis
Total Environmental Disclosure	38.44 (38.24)	14.78	0.00 (76.47)	-0.19	2.83
Environmental Policies	38.83 (41.67)	14.99	0.00 (91.67)	0.10	3.29
Product and Process-Related Environmental Issues	41.68 (37.50)	22.52	0.00 (100.00)	-0.08	2.41
Compliance with Environmental Laws and Standards	45.99 (50.00)	30.61	0.00 (100.00)	0.06	1.99
Environmental Auditing	89.19 (100.00)	31.06	0.00 (100.00)	-1.5	3.25
Sustainability	34.93 (50.00)	32.09	0.00 (100.00)	0.37	2.29
Other Environmentally-Related Information	23.47 (28.57)	16.09	0.00 (71.43)	0.37	2.61

Table 5.5 shows the descriptive statistics of the pooled total environmental disclosure quantity and the quantity of environmental disclosure within each of the disclosure categories. The overall environmental disclosure quantity level represents 38.44% of the examined checklist items. This disclosure level reflects the average increase in the environmental disclosure quantity over the period under investigation. Although the average environmental disclosure quantity is relatively low, there is an increasing trend in the quantity of environmental disclosure practices over the study period. Such an increasing trend over time emphasizes the increased awareness of corporate environmental responsibility by UK listed companies.

Moreover, environmental auditing disclosure steadily represents the highest disclosure quantity level of 89.19%, indicating that companies are using this sort of

disclosure as an effective tool in assuring the credibility of environmental practices and, hence, demonstrating environmental commitment and accountability to various stakeholders. On the other hand, other environmentally-related disclosure information represents the lowest disclosure quantity level of 23.47%. This result can be attributed to the nature of this disclosure category that includes environmental information not being addressed under any of the other environmental disclosure main categories.

In addition, the maximum average disclosure quantity is 76.47%, while the minimum average disclosure quantity is 0%, indicating a great variation in the quantity of environmental disclosure practices among the sample companies. This finding might be the effect of examining a wide range of companies with different sizes and varying degrees of environmental sensitivity. However, statistics reveal that the maximum disclosure quantity of 100% is presented by product and process-related environmental issues, compliance with environmental laws and standards, environmental auditing and sustainability, which means that at least one company has disclosed all the expected environmental disclosure items within these categories. On the contrary, for all disclosure categories, the minimum disclosure quantity is 0%, which means that at least one of the sample companies missed disclosing any information about at least one of these environmental disclosure categories.

The descriptive statistics show the normality of environmental disclosure data. It is observed that both sustainability and other environmentally-related information disclosure represent the maximum standard skewness of 0.37, while the environmental auditing shows the minimum standard skewness of -1.5. This indicates that the minimum and maximum skewness are within the normally distributed range of ±1.96 (Haniffa and Hudaib, 2006). However, the data are considered to be normally distributed if the standard kurtosis statistics fall within the range of ±3 (Haniffa and Hudaib, 2006). Accordingly, in terms of the standard kurtosis statistics, environmental disclosure data are not normally distributed. Particularly, the disclosure categories of environmental policies and environmental auditing exceed the range of ±3 indicating that such data are not normally distributed. As a consequence, a robust analysis is necessary for testing research hypotheses related to the entire data.

The extent and trend of corporate environmental disclosure quantity are portrayed in Figure 5.1.

Figure 5.1

Extent And Trend Of Corporate Environmental Disclosure Quantity

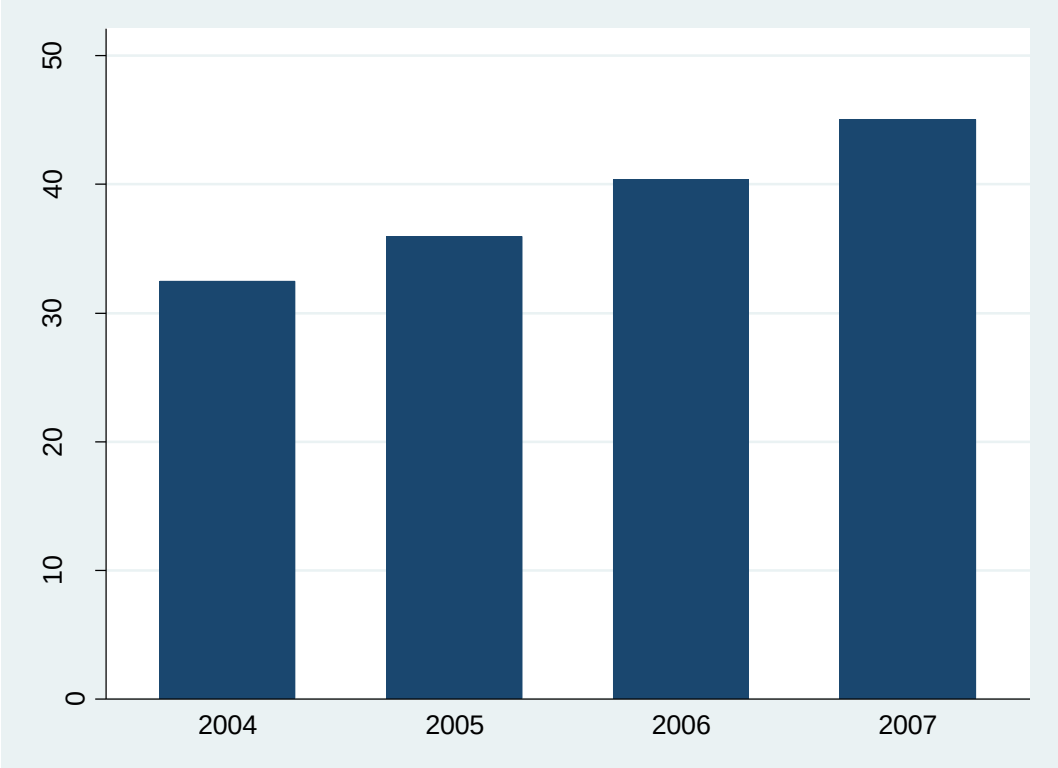


Figure 5.1 depicts the extent of total corporate environmental disclosure quantity in each of the sample years, 2004-2007 inclusive. It also shows the trend in the quantity of such disclosure over time. Although the average environmental disclosure quantity is relatively low, there is an increasing trend in the quantity of environmental disclosure practices over the study period, where the mean environmental disclosure quantity is 32.47%, 35.92%, 40.35% and 45.03% for each of the four years respectively. Such an increasing trend over time emphasizes the increased awareness of corporate environmental responsibility by UK listed companies. This increase is associated with the general increase in corporate reporting as guided by the recommendations set by professional accounting bodies and standard setters such as Global Reporting Initiative (GRI). In addition, increased corporate environmental responsibility can be attributed to the adoption of the relevant codes of best practice following the issuance of the Combined Code (2003) of corporate governance in the UK.

Using a pie chart, the distribution of the total environmental disclosure quantity over the sample years is displayed in Figure 5.2, while the distribution of the total environmental disclosure quantity over the different disclosure categories is represented in Figure 5.3.

Figure 5.2

Distribution Of Total Environmental Disclosure Quantity Over Years

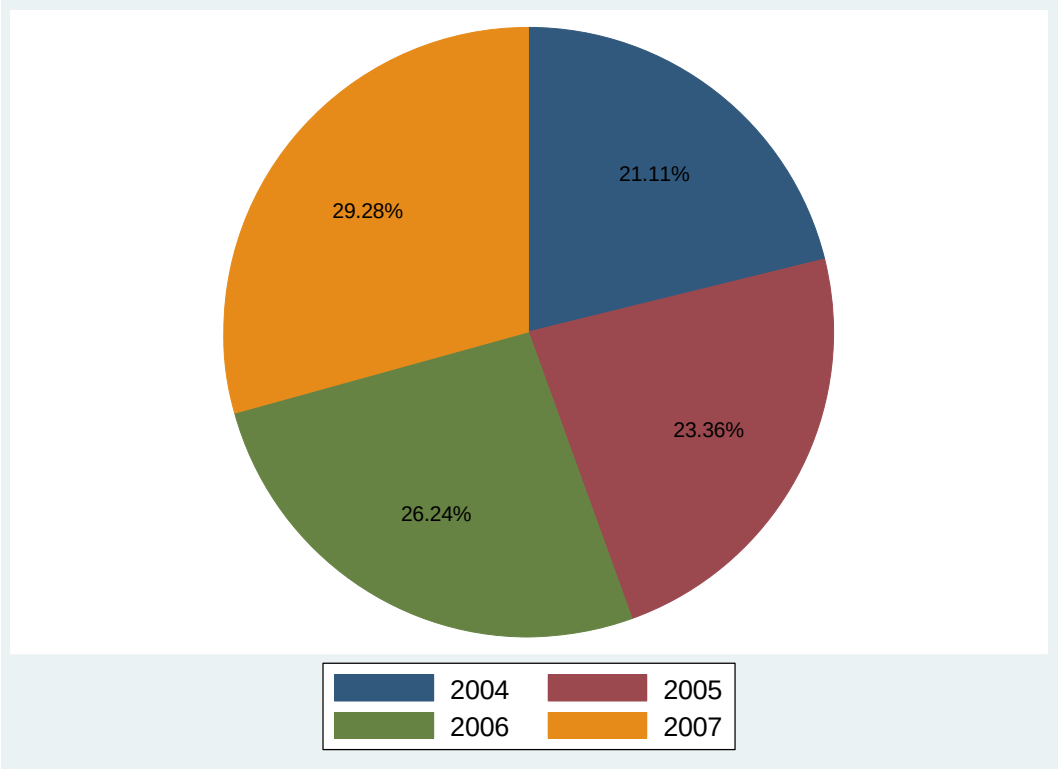


Figure 5.2 displays total corporate environmental disclosure quantity distributed over the sample years, 2004-2007 inclusive. It shows the contribution made by each year towards the average quantity of such disclosure. The figure also confirms the increasing trend in the quantity of corporate environmental disclosure over the years, where 2004 has the smallest share, followed by 2005 and then 2006, with 2007 accounting for the greatest quantity contribution towards total disclosure quantity.

Figure 5.3

Distribution Of Total Environmental Disclosure Quantity Over Categories

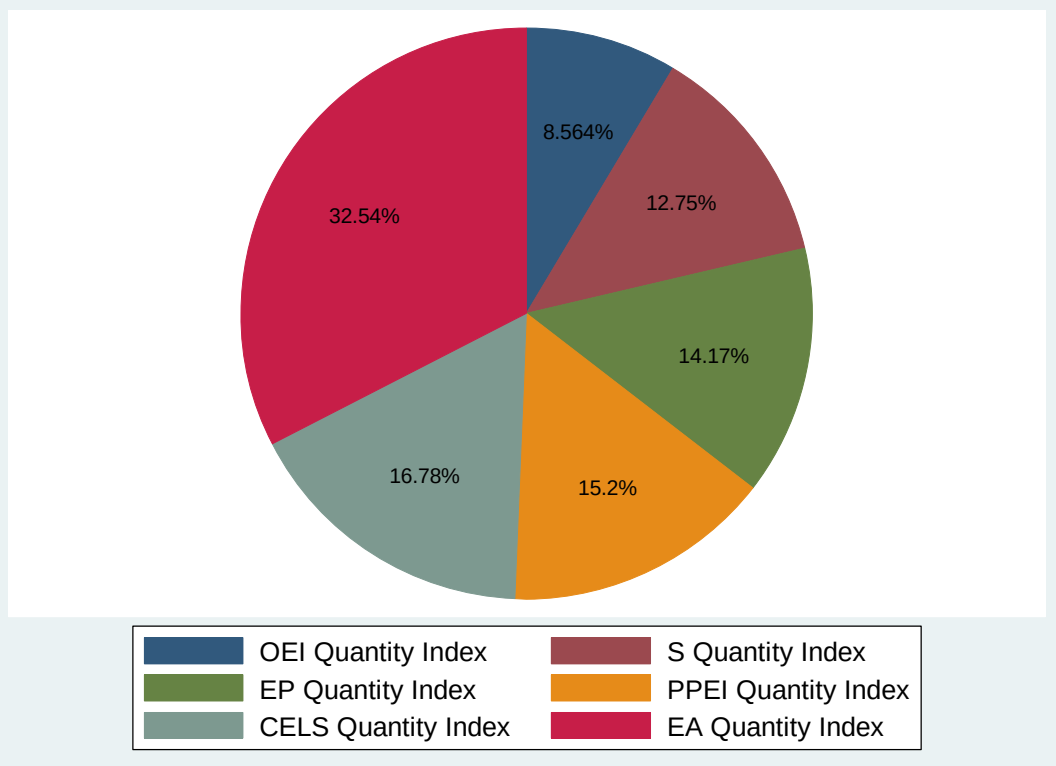


Figure 5.3 portrays total corporate environmental disclosure quantity distributed over the different environmental disclosure categories. It shows the contribution made by each category towards the average quantity of such disclosure. The pie chart indicates that the greatest quantity component of corporate environmental disclosure is environmental auditing disclosure, representing 32.54% of the total disclosure quantity. The result reveals that companies are using this sort of disclosure as an effective tool in assuring the credibility of environmental practices and, hence, demonstrating environmental commitment and accountability to various stakeholders. On the other hand, other environmentally-related information disclosure represents the smallest quantity component of corporate environmental disclosure with a share of 8.564% out of the total disclosure quantity. This result can be attributed to the nature of this disclosure category that includes environmental information not being addressed under any of the other environmental disclosure main categories.

5.3 EXAMINING THE RELATIONSHIP BETWEEN ENVIRONMENTAL DISCLOSURE QUANTITY AND CORPORATE GOVERNANCE

This section is aimed at investigating the relationship between corporate governance mechanisms and the quantity of corporate environmental disclosure practices in UK companies' annual reports. Corporate governance mechanisms are classified into the following three groups: (1) Board Characteristics: board independence, role duality, board size, board meetings, directors' qualifications and experience including educational background, community influence and cross-directorships; (2) Board Committees Characteristics: the presence of corporate environmental responsibility (CER) committee or responsible, audit committee independence, remuneration committee independence, nomination committee independence; and (3) Ownership Structure: ownership concentration, institutional ownership. In addition, the study controls for some corporate characteristics including company size, industry, profitability, leverage, liquidity, systematic risk, and cross-listing.

The section starts with some descriptive statistics of corporate governance mechanisms and corporate characteristics. Correlation analyses are then undertaken to detect any autocorrelations among variables. Different regression analyses are carried out to test the validity of the developed hypotheses in examining the relationship in question. Two models are tested in which the dependent variables are total corporate environmental disclosure quantity and the quantity of disclosure within each category. Finally, sensitivity analysis is carried out to check the robustness of the main regression analysis. Results are discussed and analyzed in terms of the theoretical framework adopted and conclusions are drawn from statistical findings.

5.3.1 Descriptive Statistics

Descriptive statistics are performed for each of corporate governance mechanisms and corporate characteristics. The results of the descriptive statistics are shown in the following tables.

Table 5.6

Descriptive Statistics Of Corporate Governance Mechanisms

Variable	Mean (Median)	Standard Deviation	Min. (Max.)	Standard Skewness	Standard Kurtosis
Board Independence	46.73 (50.00)	11.25	0.00 (100.00)	-0.10	3.82
Role Duality	0.04 (0.00)	0.19	0.00 (1.00)	4.82	24.21
Board Size	8.96 (8.00)	2.65	4.00 (21.00)	0.96	4.12
Board Meetings	8.91 (8.00)	3.04	3.00 (44.00)	2.72	24.67
Education	41.79 (40.00)	17.59	0.00 (100.00)	0.50	3.31
Community Influence	69.59 (71.43)	23.86	0.00 (100.00)	-0.60	2.53
Cross-directorships	66.88 (67.95)	21.53	0.00 (100.00)	-0.41	2.61
Corporate Environmental Responsibility (CER) Committee Presence	0.63 (1.00)	0.48	0.00 (1.00)	-0.56	1.31
Audit Committee Independence	96.19 (100.00)	12.49	0.00 (100.00)	-3.81	18.94
Remuneration Committee Independence	93.34 (100.00)	15.16	0.00 (100.00)	-2.97	14.18
Nomination Committee Independence	72.51 (71.43)	17.05	0.00 (100.00)	-0.24	3.52
Ownership Concentration	37.66 (34.79)	20.18	0.00 (98.61)	0.54	2.88
Institutional Ownership	32.59 (29.54)	18.98	0.00 (98.61)	0.78	3.33

Table 5.6 shows the descriptive statistics of the different corporate governance mechanisms examined in explaining the variability in the quantity of corporate environmental disclosure practices. The mean board independence is 46.73%, indicating that approximately half of the directors are independent non-executive, which is in line with UK Corporate Governance Code (2010). The mean role duality is 0.04, reflecting compliance by the majority of the sample companies with the corporate governance principle of separating the CEO and chairman roles. However, the average board size is 8.96, being similar to that found in the Pensions and Investment Research Consultants (PIRC, 1998) survey of UK FTSE 350 companies of 9.80, revealing that large board size has been traditional practice in UK companies over time. The average board meetings is 8.91 per year, while the mean directors' qualifications and experience vary between 41.79% for education, 69.59% for community influence, and 66.88% for cross-directorships.

With respect to board committees, the mean presence of a CER committee on the board is 0.63, indicating that the majority of the sample companies support the formation of such committees, which in turn highlights the emphasis placed by UK companies on environmental issues. Moreover, the mean independence is 96.19%, 93.34%, and 72.51% for each of the audit, remuneration, and nomination committees respectively, revealing the relatively high degree of independence within board committees. Regarding ownership structure, it can be observed that the mean ownership concentration and mean institutional ownership are quite close (37.66 and 32.59 respectively), reflecting the fact that institutional ownership constitute the major and dominant form of blockholdings.

These results are considered to be reasonable following the issuance of the Combined Code (2003) of corporate governance in the UK. It may be worth mentioning that although the code is voluntary, in that it provides only guidelines of best practice of corporate governance, London Stock Exchange listing rules require companies to adhere to corporate governance principals. UK listed companies follow the Combined Code's (2003) rule of “comply or explain”, with small companies having an excuse for noncompliance if adherence is infeasible or impractical. This is particularly true given the wide variation in most corporate governance mechanisms, ranging from a minimum of 0 to a maximum of 100%. Such great variation can also be attributed to

the unfamiliarity by some companies with the adequate application of the principles of the newly issued code succeeding the period under investigation.

Regarding the standard skewness statistics, the presented data are not normally distributed. It is observed that the standard skewness of each of role duality, board meetings, audit committee independence and remuneration committee independence exceeds the range of ±1.96 evidencing that the normality of the data (see Haniffa and Hudaib, 2006). This result is confirmed by the standard kurtosis statistics, where the standard kurtosis for most of the corporate governance mechanisms exceed the normality range of ±3 (see Haniffa and Hudaib, 2006), indicating that such data are not normally distributed. As a consequence, a robust analysis is necessary for any hypotheses test related to the entire data.

Table 5.7

Descriptive Statistics Of Corporate Characteristics

Variable	Mean (Median)	Standard Deviation	Min. (Max.)	Standard Skewness	Standard Kurtosis
Size	5.91 (5.82)	0.74	4.30 (8.16)	0.44	2.82
Industry	0.36 (0.00)	0.48	0.00 (1.00)	0.59	1.35
Profitability	0.87 (0.91)	0.35	-2.00 (1.84)	-1.70	11.76
Leverage	1.17 (1.34)	0.58	-1.70 (2.12)	-2.05	7.99
Liquidity	1.54 (1.26)	1.94	0.00 (50.00)	17.75	430.14
Systematic Risk	1.00 (0.99)	0.35	0.02 (2.19)	0.24	3.03
Cross-Listing	0.11 (0.00)	0.31	0.00 (1.00)	2.51	7.28

Table 5.7 shows the descriptive statistics of the different corporate characteristics being controlled for. It can be observed that the sample companies are approximately divided equally between large and small companies (a mean of 5.91 between a minimum of 4.30 and a maximum of 8.16). However, the majority of the sample companies are operating in industries with lower environmental sensitivity (a mean of 0.36 between a minimum of 0.00 and a maximum of 1.00). There appears to be a wide variation between the maximum and minimum values among most of the company's attributes. This result is expected reflecting the impact of examining a wide range of companies with different size, varying degrees of environmental sensitivity, and various levels of profitability, leverage, liquidity, systematic risk, as well as different listing status. Liquidity has the greatest variation ranging from 0% to 50%. Therefore these variables are highly skewed, indicating the lack of normality in distribution. Particularly, leverage, liquidity and cross-listing exceeds the normality range of ±1.96. In addition, the standard kurtosis for almost all corporate characteristics, with the exception of size and industry, exceed the normality range of ±3 (see Haniffa and Hudaib, 2006), indicating that such data are not normally distributed. Accordingly, more attention is required in the analysis of such non-parametric data and interpretation of the results.

5.3.2 Correlation Analysis

Correlation analysis is carried out to detect any autocorrelation between corporate environmental disclosure quantity and each of the different corporate governance mechanisms and corporate characteristics. Such bivariate analysis is undertaken using Pearson correlation and Spearman's Rank correlation. Both parametric and non parametric tests are used to examine the required relationships in order to allow for the non normality for some of the variables in question. In addition, correlation coefficients are also intended to attest the construct validity of the disclosure measurement and to check for multicollinearity. Pearson and Spearman's Rank correlation coefficients for the association between each of the total corporate environmental disclosure quantity and the quantity of disclosure within each category and all corporate governance and corporate characteristics included in the analysis are shown in the following tables.

Table 5.8
Pearson Correlations Of Environmental Disclosure Quantity to Corporate Governance Mechanisms And Corporate Characteristics

	TED	EP	PPEI	CELS	EA	S	OEI	BI	RD	BS	BM	E	CI	CD	CERP	ACI	RCI	NCI	OC	IO	SZ	IND	PRO	LEV	LIQ	SR	CL
TED	1																										
EP	0.8441*	1																									
PPEI	0.7941*	0.5374*	1																								
CELS	0.6736*	0.4780*	0.4029*	1																							
EA	0.4496*	0.3428*	0.2755*	0.2417*	1																						
S	0.5364*	0.3996*	0.3197*	0.2110*	0.2641*	1																					
OEI	0.6786*	0.4768*	0.3853*	0.3199*	0.3270*	0.3697*	1																				
BI	0.1138*	0.0939*	0.0800*	0.0116	0.1037*	0.2324*	0.0569	1																			
RD	-0.1786*	-0.1460*	-0.0971*	-0.1042*	-0.1140*	-0.1283*	-0.1898*	0.0149	1																		
BS	0.1296*	0.1694*	0.0096	-0.0109	0.1420*	0.2557*	0.1189*	0.1565*	-0.0679*	1																	
BM	0.0436	0.0071	-0.0127	0.048	0.0479	0.0585	0.1042*	0.0175	0.0153	-0.1317*	1																
E	-0.007	0.0247	-0.0193	-0.0064	-0.1387*	0.0066	-0.0012	0.1369*	-0.0852*	-0.2652*	0.0287	1															
CI	0.0048	0.0559	-0.0277	-0.0354	-0.0158	0.0956*	-0.0314	0.1404*	-0.0006	-0.0345	0.0041	0.2218*	1														
CD	0.2086*	0.2135*	0.0719*	0.1174*	0.2380*	0.2930*	0.1105*	0.4310*	-0.2145*	0.3368*	-0.0551	-0.0719*	0.0809*	1													
CERP	0.3014*	0.2294*	0.2328*	0.1357*	0.3197*	0.2052*	0.2506*	0.0964*	-0.0970*	0.1995*	-0.0732*	-0.0335	0.034	0.2309*	1												
ACI	0.1486*	0.1073*	0.1382*	0.0693*	0.0834*	0.1421*	0.0903*	0.3994*	-0.0760*	-0.0297	-0.027	0.1595*	0.05	0.0604	0.0542	1											
RCI	0.0563	0.0318	0.0477	0.0255	0.0519	0.051	0.0515	0.3264*	-0.0251	-0.064	0.0133	0.1557*	0.0719*	0.0229	-0.0002	0.7453*	1										
NCI	-0.0044	-0.0098	-0.0092	-0.0225	0.0475	0.0253	0.0166	0.3052*	-0.0266	-0.0635	0.0068	0.1506*	0.0436	0.039	0.0235	0.4150*	0.4345*	1									
OC	-0.2396*	-0.1956*	-0.1272*	-0.1587*	-0.1475*	-0.2449*	-0.1973*	-0.2789*	0.1235*	-0.2332*	0.0053	0.0189	-0.0188	-0.2311*	-0.1482*	-0.2627*	-0.2301*	0.0372	1								
IO	-0.1318*	-0.0903*	-0.1006*	-0.1073*	-0.0895*	-0.1371*	-0.0614	-0.1506*	-0.0504	-0.1128*	0.0069	0.0176	-0.0546	-0.0758*	-0.0877*	-0.2123*	-0.2041*	0.0297	0.8384*	1							
SZ	0.2960*	0.3164*	0.1209*	0.0868*	0.2416*	0.3966*	0.2356*	0.4072*	-0.1199*	0.6647*	-0.0519	-0.1386*	0.0222	0.4817*	0.2537*	0.1353*	0.0285	-0.009	-0.4584*	-0.3314*	1						
IND	0.1690*	0.2049*	0.0473	0.1426*	0.0840*	0.0846*	0.1196*	0.0061	0.0174	0.0473	-0.1062*	-0.0403	-0.0061	0.0327	0.0943*	0.0498	0.0813*	-0.0456	-0.1252*	-0.0696*	0.0401	1					
PRO	0.0666	0.045	0.0504	0.0341	0.0322	0.0593	0.0638	0.0193	-0.0324	0.0629	-0.0489	-0.0106	0.0764*	-0.0492	0.0978*	0.0288	0.0469	-0.0467	-0.052	-0.0750*	-0.001	0.0445	1				
LEV	0.1301*	0.1927*	0.0289	0.001	0.1236*	0.0955*	0.1300*	0.0755*	-.0713*	0.1806*	-0.0208	0.0166	-0.0153	0.1319*	0.0974*	0.0720*	0.0002	0.0141	-.0964*	-0.0387	0.2922*	-.0951*	-.0845*	1			
LIQ	-0.035	-.0703*	-0.0077	0.0750*	-0.0147	-0.0184	-.0986*	-0.0452	0.0272	-0.0605	-0.0572	0.033	-0.0142	-0.0521	-.0828*	0.0293	0.0476	-0.0053	-0.0229	-0.0372	-.1502*	0.0800*	0.1021*	-.3231*	1		
SR	0.1051*	0.1146*	0.0291	0.1120*	-0.0023	0.0231	0.1015*	0.0251	-0.0263	0.0125	-0.0336	0.0613	-.1455*	0.0652*	0.056	0.0179	0.003	-0.0816*	-0.0284	0.063	0.0978*	0.2084*	-0.0373	0.0856*	-0.0483	1	
CL	-0.0496	-0.0155	-0.0455	-.0857*	-0.036	0.0771*	-0.0631	0.0989*	-.0698*	0.2982*	-0.0442	0.0234	0.0316	0.1627*	0.0114	0.0003	0.0038	0.0587	-0.0186	-0.0424	0.2363*	-0.057	-0.0043	0.049	-0.019	-0.0586	1

* Significance at confidence level of 95%. **TED** Total Environmental Disclosure, **EP** Environmental Policies, **PPEI** Product and Process-Related Environmental Issues, **CELS** Compliance with Environmental Laws and Standards, **EA** Environmental Auditing, **S** Sustainability, **OEI** Other Environmentally-Related Information, **BI** Board Independence, **RD** Role Duality, **BS** Board Size, **BM** Board Meetings, **E** Education, **CI** Community Influence, **CD** Cross-Directorships, **CERP** Corporate Environmental Responsibility (CER) Committee Presence, **ACI** Audit Committee Independence, **RCI** Remuneration Committee Independence, **NCI** Nomination Committee Independence, **OC** Ownership concentration, **IO** Institutional Ownership, **SZ** Size, **IND** Industry, **PRO** Profitability, **LEV** Leverage, **LIQ** Liquidity, **SR** Systematic Risk, **CL** Cross-Listing.

Table 5.9
Spearman Correlations Of Environmental Disclosure Quantity to Corporate Governance Mechanisms And Corporate Characteristics

	TED	EP	PPEI	CELS	EA	S	OEI	BI	RD	BS	BM	E	CI	CD	CERP	ACI	RCI	NCI	OC	IO	SZ	IND	PRO	LEV	LIQ	SR	CL
TED	1																										
EP	0.8275*	1																									
PPEI	0.7990*	0.5406*	1																								
CELS	0.6566*	0.4629*	0.3891*	1																							
EA	0.3340*	0.2493*	0.2140*	0.1860*	1																						
S	0.5297*	0.3889*	0.3462*	0.1750*	0.2271*	1																					
OEI	0.6533*	0.4366*	0.3860*	0.3090*	0.2777*	0.3460*	1																				
BI	0.1392*	0.1396*	0.0725*	0.0155	0.1288*	0.2387*	0.0521	1																			
RD	-0.1895*	-0.1573*	-0.1509*	-0.1250*	-0.1404*	-0.1382*	-0.1898*	0.0163	1																		
BS	0.1003*	0.1089*	0.0155	-0.039	0.1319*	0.2395*	0.1136*	0.2178*	-0.0442	1																	
BM	0.0292	0.0053	-0.0104	0.0665	0.0329	0.0061	0.0614	0.0419	-0.0103	-0.1149*	1																
E	0.1072*	0.1221*	0.0861*	0.0498	-0.0448	0.0605	0.0710*	0.1117*	-0.0788*	-0.2450*	0.0322	1															
CI	0.0594	0.0871*	0.0204	0.0113	0.0355	0.1182*	0.0073	0.1699*	-0.0828*	-0.0328	-0.007	0.2201*	1														
CD	0.1981*	0.2214*	0.0597	0.0876*	0.2390*	0.3275*	0.0873*	0.4743*	-0.1946*	0.3132*	-0.0334	-0.0126	0.1503*	1													
CERP	0.2461*	0.1589*	0.2134*	0.1003*	0.2640*	0.2003*	0.2334*	0.1270*	-0.1285*	0.1828*	-0.0142	0.0546	0.0645	0.2241*	1												
ACI	0.1677*	0.1125*	0.1510*	0.0602	0.0967*	0.1641*	0.1180*	0.3187*	-0.0538	0.0046	0.0206	0.1225*	0.034	0.0373	0.0576	1											
RCI	0.0584	0.0434	0.0321	0.0227	0.0647	0.0342	0.0547	0.2211*	-0.0024	-0.0123	0.043	0.0927*	0.0777*	0.0087	0.0017	0.5694*	1										
NCI	-0.0239	-0.0314	-0.0164	-0.0211	0.0341	0.0311	0.0045	0.2653*	-0.0664	-0.0025	0.0571	0.0979*	0.0109	0.0750*	0.0533	0.3194*	0.3476*	1									
OC	-0.2429*	-0.1772*	-0.1556*	-0.1266*	-0.0958*	-0.2520*	-0.1776*	-0.2733*	0.0774*	-0.3061*	-0.0993*	0.0022	-0.0844*	-0.2211*	-0.1330*	-0.1934*	-0.1616*	0.0248	1								
IO	-0.1457*	-0.0828*	-0.1282*	-0.0882*	-0.0678	-0.1664*	-0.0504	-0.1368*	-0.0137	-0.1873*	-0.0763*	0.0285	-0.0753*	-0.0999*	-0.0714*	-0.1420*	-0.1409*	0.0162	0.8451*	1							
SZ	0.2498*	0.2555*	0.1133*	0.0244	0.1989*	0.3992*	0.2006*	0.4464*	-0.1021*	0.6364*	-0.0311	-0.0780*	0.0541	0.5114*	0.2236*	0.1606*	0.0452	0.0366	-0.4979*	-0.3742*	1						
IND	0.1955*	0.1895*	0.0688	0.1618*	0.0719*	0.0891*	0.1586*	0.0041	0.0156	0.0629	-0.0897*	-0.0458	-0.0234	0.0192	0.0950*	0.0237	0.0538	-0.0812*	-0.1342*	-0.0663	0.0447	1					
PRO	0.0576	0.0457	0.0268	0.0133	-0.0109	0.0722*	0.0402	0.0255	-0.0383	0.058	-0.037	0.0046	0.0651	-0.0219	0.1027*	0.0224	0.019	-0.1092*	-0.0404	-0.0228	-0.0081	0.1031*	1				
LEV	0.0770*	0.1113*	0.01	-0.0096	0.1366*	0.0777*	0.1401*	0.0577	-0.0666	0.1953*	-0.0419	0.017	-0.0767*	0.1505*	0.1040*	0.0656	-0.0246	-0.0235	-0.1543*	-0.0919*	0.3184*	-0.1163*	-0.1160*	1			
LIQ	0.0771*	0.0223	0.0314	0.2429*	-0.0444	-0.1091*	-0.012	-0.0826*	-0.009	-0.2006*	-0.0929*	0.0177	-0.04	-0.1183*	-0.0778*	0.0096	0.0384	-0.1094*	0.0158	0.0554	-0.2444*	0.2698*	0.1400*	-0.3146*	1		
SR	0.0989*	0.0915*	0.0335	0.0772*	-0.0248	0.0055	0.1015*	-0.0277	-0.0075	-0.0053	0.0271	0.1169*	-0.1266*	-0.0339	0.0297	0.0212	0.0175	-0.0955*	0.0098	0.0775*	0.0482	0.1936*	-0.0154	0.0234	0.0991*	1	
CL	-0.0084	0.0264	-0.0256	-0.0471	0.0442	0.1266*	-0.0344	0.1301*	-0.0583	0.2664*	-0.0747*	-0.0181	0.0201	0.2304*	0.0374	-0.0131	0.029	0.1048*	-0.0342	-0.0539	0.2565*	-0.0167	-0.0149	-0.0011	-0.1536*	-0.0407	1

* Significance at confidence level of 95%. **TED** Total Environmental Disclosure, **EP** Environmental Policies, **PPEI** Product and Process-Related Environmental Issues, **CELS** Compliance with Environmental Laws and Standards, **EA** Environmental Auditing, **S** Sustainability, **OEI** Other Environmentally-Related Information, **BI** Board Independence, **RD** Role Duality, **BS** Board Size, **BM** Board Meetings, **E** Education, **CI** Community Influence, **CD** Cross-Directorships, **CERP** Corporate Environmental Responsibility (CER) Committee Presence, **ACI** Audit Committee Independence, **RCI** Remuneration Committee Independence, **NCI** Nomination Committee Independence, **OC** Ownership concentration, **IO** Institutional Ownership, **SZ** Size, **IND** Industry, **PRO** Profitability, **LEV** Leverage, **LIQ** Liquidity, **SR** Systematic Risk, **CL** Cross-Listing.

Table 5.8 presents a Pearson correlation matrix for the variables included in the analysis. Pearson correlation coefficients show association of each of the total corporate environmental disclosure quantity and the quantity of disclosure within each category to all corporate governance and corporate characteristics included in the analysis. The significant association is identified at confidence level of 95%. Results indicate that at this level of environmental disclosure quantity there is a significant association between total environmental disclosure quantity and most corporate governance characteristics, including board independence, role duality, board size, cross-directorships, corporate environmental responsibility (CER) committee presence, audit committee independence, ownership concentration and institutional ownership. Referred to the correlation coefficients, there is a positive relationship between total environmental disclosure quantity and each of board independence, board size, cross-directorships, corporate environmental responsibility (CER) committee presence and audit committee independence, while there is a negative relationship between total environmental disclosure quantity and each of role duality, ownership concentration and institutional ownership. Most of these results are in agreement with research hypotheses regarding the association between total environmental disclosure quantity and the different corporate governance mechanisms.

Regarding the different categories of environmental disclosure, there is a significant positive relationship between board independence and disclosure quantity of each of environmental policies, product and process-related environmental issues, environmental auditing and sustainability. There is a consistently significant negative relationship between role duality and disclosure quantity of each of the disclosure categories. Board size is significantly and positively associated with disclosure quantity of each of environmental policies, environmental auditing, sustainability and other environmentally-related information. Board meetings is associated with only other environmentally-related information quantity and directors' education is associated with only environmental auditing disclosure quantity, while community influential directors is correlated to only sustainability disclosure quantity. However, cross-directorships have a persistent significant and positive relationship to disclosure quantity of each of the disclosure categories. Similarly, corporate environmental responsibility (CER) committee presence and audit committee independence are

significantly and positively associated with disclosure quantity of each of environmental disclosure categories. Finally, ownership structure including both ownership concentration and institutional ownership are significantly and negatively associated with disclosure quantity of each of the disclosure categories.

Results also reveal a significant positive relationship between total environmental disclosure quantity and corporate characteristics including company size, industry, leverage and systematic risk. No significant relationship is detected between total environmental disclosure quantity and each of profitability, liquidity and cross-listing. With respect to environmental disclosure categories, the results confirmed the significant positive association of both company size and industry with disclosure quantity of almost all disclosure categories. However, for the other corporate characteristics including leverage, liquidity, systematic risk and cross-listing, the results are partially supported for some of the disclosure categories. Nevertheless, the insignificant relationship of profitability to disclosure quantity is consistently confirmed for all environmental disclosure categories.

Table 5.9 presents a Spearman correlation matrix for the variables included in the analysis. Spearman's rank correlation coefficients show association of each of the total corporate environmental disclosure quantity and the quantity of disclosure within each category to all corporate governance and corporate characteristics included in the analysis. The significant association is identified at confidence level of 95%. Results for total corporate environmental disclosure quantity strongly support the findings of the Pearson test regarding all corporate governance variables, except for directors' education, which was found to be significantly and positively associated with total disclosure quantity. Moreover, concerning the different categories of environmental disclosure, Spearman coefficients show consistent results with Pearson correlations of almost all corporate governance variables, including board independence, role duality, board size, cross-directorships, corporate environmental responsibility (CER) committee presence, audit committee independence, ownership concentration and institutional ownership, to disclosure quantity of most of the disclosure categories. However, board meetings have no significant relationship to disclosure quantity of any of the categories, while directors' education was found to be associated with disclosure quantity of each of environmental policies, product and process-related

environmental issues and other environmentally-related information. Community influential directors are correlated to disclosure quantity of environmental policies in addition to sustainability. Most of these results are in agreement with research hypotheses regarding the association between environmental disclosure quantity and the different corporate governance mechanisms.

Spearman coefficients also support the results of the Pearson test regarding almost all corporate characteristics, revealing a significant positive relationship between total environmental disclosure quantity and each of company size, industry, leverage and systematic risk, and insignificant relationship with each of profitability and cross-listing. However, unlike Pearson coefficients, liquidity appeared to have significant positive association with total disclosure quantity. With respect to environmental disclosure categories, the results confirmed the significant positive association of both company size and industry with disclosure quantity of almost all disclosure categories. However, for the other corporate characteristics including profitability, leverage, liquidity, systematic risk and cross-listing, the results are partially supported for some of the disclosure categories.

5.3.2.1 Construct Validity

Construct validity of the disclosure measurement focuses on consistency with theoretical expectations and evidence from literature. Correlation analysis is suggested as a means by which construct validity can be established (Sekaran, 2003). Correlation coefficients have been used in prior disclosure studies to assess the validity of disclosure scores (see Ahmed and Courtis, 1999; Botosan, 1997; Cheng and Courtenay, 2006). Using correlation analysis, two tests are performed to check the construct validity of the disclosure indices. Primarily, correlation between the disclosure index and its component indices has been employed. In addition, correlation between disclosure indices and significant explanatory variables identified in prior studies has been used to validate the disclosure index (see Ahmed and Courtis, 1999; Botosan, 1997).

Following these studies, correlation analysis of the total environmental disclosure quantity index and its component indices of environmental disclosure categories was conducted. The results of Pearson correlation and Spearman's rank correlation are shown in Table 5.8 and Table 5.9 respectively. Both Pearson and Spearman correlation coefficients show that the disclosure quantity indices of all environmental disclosure categories are highly correlated to the total environmental disclosure quantity index. This indicates how well the classification or grouping scheme interprets the total score. Moreover, it is expected that a company's disclosure strategies are similar as to the different categories of disclosure (Botosan, 1997; Cheng and Courtenay, 2006). In this respect, the results also reveal that the quantity indices of the different environmental disclosure categories are correlated to each other.

In addition, two corporate characteristics documented by prior disclosure studies to be key determinants in explaining the variation in disclosure practices are company size and industry. Therefore, the correlation between the quantity indices of each of total environmental disclosure and its categories and each of company size and industry is investigated. Pearson and Spearman correlation coefficients indicate that total environmental disclosure quantity index is correlated to each of the two corporate characteristics. Results also show that disclosure quantity indices of almost all environmental disclosure categories are correlated to each of company size and industry (see Table 5.8 and Table 5.9 respectively). Taken together the results confirm that disclosure quantity indices have a considerable degree of validity in that they consistently capture the quantity of environmental disclosure practices in the annual reports.

5.3.2.2 Multicollinearity Check

Multicollinearity implies the existence of a linear relationship between two or more explanatory variables. Multicollinearity makes it difficult to differentiate the individual effects of the explanatory variables and regression estimators may be biased in that they tend to have large variances (Murray, 2006). Furthermore, if there is a perfect linear relationship among the explanatory variables, the estimates for a

regression model cannot be uniquely computed. The possible existence of multicollinearity is tested based on the correlation matrix incorporating all the independent and control variables. Both Pearson and Spearman's rank correlation matrices show that correlation coefficients are less than 0.8, the limit or cut off correlation percentage commonly suggested by prior studies after which multicollinearity is likely to exist (see Gujarati, 2003). These results suggest that there is no need to be concerned about the correlation of either the independent variables to each other, the control variables to each other, or the independent variables to the control variables.

An exception is the coefficient of correlation between the two independent variables representing ownership structure. Specifically, there is a slight multicollinearity between ownership concentration and institutional ownership, where Pearson and Spearman correlation coefficients are 0.8384 and 0.8160 respectively (see Table 5.8 and Table 5.9). This result is expected given that institutional ownership constitutes the major and dominant form of blockholdings. However, as such multicollinearity is only slightly in excess of the optimal limit, results indicate that multicollinearity is unlikely to be a potential problem. Nevertheless, the statistical effect of including both ownership concentration and institutional ownership in the same regression model will be further examined.

The possible existence of multicollinearity is further tested through computing the variance inflation factor (VIF). According to Gujarati (2003), there is no problem if the VIF is less than 10 and the tolerance coefficient is greater than 0.10. Table 5.10 presents the variance inflation factor (VIF) and tolerance coefficients of each of the explanatory variable. The table shows that the highest VIF is 5.21 and the mean VIF is 1.91. Moreover, the lowest tolerance coefficient is 0.192. Therefore, the results of VIF and tolerance coefficients indicate that there is no unacceptable level of multicollinearity among the current study's variables, confirming that there is no need to be concerned about the correlation between the explanatory variables.

Table 5.10

Variance Inflation Factor (VIF) Of Corporate Governance Mechanisms And Corporate Characteristics

Variable	VIF	Tolerance 1/VIF
Ownership Concentration	5.21	0.192
Institutional Ownership	4.57	0.219
Size	2.99	0.335
Audit Committee Independence	2.72	0.368
Remuneration Committee Independence	2.58	0.388
Board Size	2.23	0.448
Board Independence	1.94	0.517
Cross-directorships	1.63	0.614
Nomination Committee Independence	1.47	0.682
Liquidity	1.28	0.783
Leverage	1.25	0.802
Education	1.24	0.808
Cross-Listing	1.22	0.823
Role Duality	1.20	0.836
Industry	1.18	0.847
Systematic Risk	1.13	0.883
Corporate Environmental Responsibility (CER) Committee Presence	1.13	0.886
Community Influence	1.13	0.887
Profitability	1.09	0.916
Board Meetings	1.08	0.927
Mean VIF	1.91	

5.3.3 Regression Analysis

Multiple regression analysis using Ordinary Least Squares (OLS) longitudinal panel regression with robust standard error is employed to test the developed research hypotheses. Such multivariate analysis is undertaken to examine the relationship between corporate environmental disclosure quantity and each of the different corporate governance mechanisms after controlling for corporate characteristics. Two models are tested in which the dependent variables are total corporate environmental disclosure quantity and the quantity of disclosure within each disclosure category.

In addition, Generalized Least Squares (GLS) regression is performed to further test the research hypotheses and to attest the reliability of the main OLS regression results. GLS takes into consideration that the variances of the observations might be unequal and/or there might be a certain degree of correlation between the observations. Finally, sensitivity analysis using pooled cross-sectional Ordinary Least Squares (OLS) regression with robust standard error is carried out to check the sensitivity and, hence, the robustness of the main regression analysis. Results are discussed and analyzed in terms of the theoretical framework adopted and conclusions are drawn from statistical findings.

5.3.3.1 OLS Regression Analysis

Ordinary Least Squares (OLS) longitudinal panel regression with robust standard error is employed to test the developed research hypotheses. The advantage of panel data regression is that it takes the time effect into account. The robust standard error option is applied in order to adjust the OLS parametric test to fit with non-parametric data, as shown by the descriptive statistics indicating that the study's data are not normally distributed. The results of the Ordinary Least Squares (OLS) regression of corporate governance on environmental disclosure quantity are shown in Table 5.11.

Table 5.11
OLS Longitudinal Panel Regression With Robust Standard Error Of Corporate Governance On Environmental Disclosure Quantity

	TED		**EP**		**PPEI**		**CELS**		**EA**		**S**		**OEI**	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Intercept	6.99	0.228	-1.86	0.711	32.29*	0.052	38.62*	0.069	34.29**	0.025	-83.31**	0.026	-3.39	0.190
BI	-0.11**	0.011	-0.13**	0.025	-0.03	0.431	-0.16	0.198	-0.11	0.296	-0.02	0.722	-0.17***	0.001
RD	-11.38***	0.001	-7.77***	0.003	-16.86***	0.000	-13.99**	0.047	-13.03	0.249	-9.45	0.121	-10.11**	0.018
BS	-0.27	0.446	-0.06	0.857	-0.86	0.274	-0.19	0.499	-0.58	0.203	0.56	0.361	-0.19	0.390
BM	0.42**	0.045	0.31	0.161	-0.07	0.307	1.23**	0.045	0.66	0.236	0.56	0.256	0.63***	0.002
E	0.06	0.213	0.09*	0.077	0.03	0.453	0.01	0.849	-0.13	0.149	0.13	0.302	0.05*	0.083
CI	0.00	0.864	0.03	0.248	-0.03	0.294	0.00	0.922	-0.01	0.809	0.06	0.110	-0.02	0.403
CD	0.06**	0.010	0.07***	0.005	-0.03*	0.089	0.16***	0.001	0.24***	0.007	0.20**	0.014	0.00	0.963
CERP	4.42***	0.000	1.21	0.203	8.09***	0.000	4.15**	0.015	12.07***	0.000	4.24***	0.009	4.76***	0.001
ACI	0.09	0.129	0.04	0.528	0.23**	0.019	-0.02	0.877	0.09	0.180	0.31*	0.068	0.01	0.843
RCI	0.01	0.772	0.02	0.622	-0.05	0.228	0.04	0.777	0.10	0.225	-0.12	0.206	0.06	0.109
NCI	-0.06*	0.073	-0.05	0.105	-0.12**	0.032	-0.04	0.352	-0.05	0.464	-0.07	0.502	0.00	0.923
OC	-0.10***	0.002	-0.07**	0.025	-0.04	0.587	-0.17***	0.006	0.21	0.208	-0.06	0.358	-0.23***	0.003
IO	0.04	0.170	0.07**	0.021	-0.07	0.383	-0.04	0.291	-0.18	0.343	0.02	0.734	0.21**	0.013
SZ	3.78**	0.020	4.66***	0.002	3.31	0.169	-1.46	0.546	4.67*	0.058	12.22**	0.016	3.47***	0.008
IND	4.72***	0.001	6.26***	0.005	2.18*	0.092	6.47**	0.041	3.89**	0.049	4.91***	0.002	3.87***	0.007
PRO	-0.26	0.418	0.29	0.699	-1.43	0.298	-4.61**	0.011	0.25	0.809	2.68	0.511	1.76	0.120
LEV	0.90**	0.034	2.40**	0.016	-1.69	0.118	1.31	0.306	2.47	0.320	-1.38	0.482	1.38	0.101
LIQ	0.80*	0.063	0.22	0.279	-0.65	0.228	7.39***	0.005	-0.35	0.827	0.67	0.665	-0.07	0.927
SR	-1.18	0.341	-0.73	0.450	-2.42	0.261	0.92	0.595	-3.67	0.187	-4.52	0.330	-0.44	0.538
CL	-2.26*	0.079	-2.12*	0.083	-1.97	0.322	-3.02	0.457	-1.60	0.675	1.22	0.614	-3.47*	0.061
Adjusted R^2 (%)	20.35		18.91		10.63		10.14		14.38		22.65		15.87	

***$p \leq 0.01$, **$p \leq 0.05$, and *$p \leq 0.10$.

TED Total Environmental Disclosure, **EP** Environmental Policies, **PPEI** Product and Process-Related Environmental Issues, **CELS** Compliance with Environmental Laws and Standards, **EA** Environmental Auditing, **S** Sustainability, **OEI** Other Environmentally-Related Information, **BI** Board Independence, **RD** Role Duality, **BS** Board Size, **BM** Board Meetings, **E** Education, **CI** Community Influence, **CD** Cross-Directorships, **CERP** Corporate Environmental Responsibility (CER) Committee Presence, **ACI** Audit Committee Independence, **RCI** Remuneration Committee Independence, **NCI** Nomination Committee Independence, **OC** Ownership concentration, **IO** Institutional Ownership, **SZ** Size, **IND** Industry, **PRO** Profitability, **LEV** Leverage, **LIQ** Liquidity, **SR** Systematic Risk, **CL** Cross-Listing.

Table 5.11 presents the results of Ordinary Least Squares (OLS) longitudinal panel regression with robust standard error of corporate governance on environmental disclosure quantity. Results show a significant positive association between total environmental disclosure quantity and each of board meetings ($p \leq 0.05$), cross-directorships ($p \leq 0.05$) and the presence of corporate environmental responsibility (CER) committee ($p \leq 0.01$). Results also indicate a strong significant negative association of total environmental disclosure quantity with each of board independence ($p \leq 0.05$), role duality ($p \leq 0.01$) and ownership concentration ($p \leq 0.01$) and relatively less significant negative association with nomination committee independence ($p \leq 0.10$). However, no significant association is found between total environmental disclosure quantity and each of board size, directors' education and community influence, audit committee independence, remuneration committee independence, and institutional ownership, although the positive relationships are mostly in the expected direction, except for board size where a negative relationship is documented. The adjusted R Squared of the model is 20.35% indicating that 20.35% of the changes in total environmental disclosure quantity is explained by the changes in its examined determinants.

Regarding the different categories of environmental disclosure, there is a significant negative relationship between board independence and disclosure quantity of each of environmental policies ($p \leq 0.05$) and other environmentally-related information ($p \leq 0.01$). Similarly, there is a strong significant negative relationship between role duality and disclosure quantity of each of environmental policies ($p \leq 0.01$), product and process-related environmental issues ($p \leq 0.01$), compliance with environmental laws and standards ($p \leq 0.05$) and other environmentally-related information ($p \leq 0.05$). However, board size has insignificant association with the disclosure quantity of all of the disclosure categories. There is also a significant positive relationship between board meetings and disclosure quantity of each of compliance with environmental laws and standards ($p \leq 0.05$) and other environmentally-related information ($p \leq 0.01$).

With respect to directors' qualifications and experience, although education has only marginally significant positive association with the disclosure quantity of each of environmental policies ($p \leq 0.10$) and other environmentally-related information ($p \leq$

0.10), community influence is associated with the disclosure quantity of none of the disclosure categories, while cross-directorships has a persistent strong significant and positive relationship to disclosure quantity of almost all of the disclosure categories including environmental policies ($p \leq 0.01$), compliance with environmental laws and standards ($p \leq 0.01$), environmental auditing ($p \leq 0.01$) and sustainability ($p \leq 0.05$).

Referring to board committees, corporate environmental responsibility (CER) committee presence has a strong significant positive relationship to disclosure quantity of almost all of the disclosure categories ($p \leq 0.01$), except for environmental policies. There is a significant positive relationship between audit committee independence and disclosure quantity of each of product and process-related environmental issues ($p \leq 0.05$) and sustainability ($p \leq 0.10$). However, no significant association is detected between remuneration committee independence and the disclosure quantity of all of the disclosure categories, while a significant negative relationship is found between nomination committee independence and disclosure quantity of only product and process-related environmental issues ($p \leq 0.05$).

As for ownership structure, it can be observed that ownership concentration is significantly and negatively associated with disclosure quantity of each of environmental policies ($p \leq 0.05$), compliance with environmental laws and standards ($p \leq 0.01$) and other environmentally-related information ($p \leq 0.01$). However, institutional ownership is found to be significantly and positively associated with disclosure quantity of each of environmental policies ($p \leq 0.05$) and other environmentally-related information ($p \leq 0.05$).

Results also reveal a significant positive relationship between total environmental disclosure quantity and corporate characteristics including company size ($p \leq 0.05$), industry ($p \leq 0.01$), leverage ($p \leq 0.05$) and liquidity ($p \leq 0.10$), while a significant negative relationship to cross-listing ($p \leq 0.10$). No significant relationship is detected between total environmental disclosure quantity and each of profitability and systematic risk. Concerning environmental disclosure categories, the results confirmed the significant positive association of company size with disclosure quantity of most disclosure categories. It is also observed that disclosure quantity of all environmental disclosure categories has significant relationship ($p \leq 0.01$) with industry. However, for the other corporate characteristics including leverage, liquidity

and cross-listing, the results partially supported the insignificant relationship to the quantity of some of the disclosure categories. Nevertheless, the insignificant relationship of profitability to disclosure quantity is confirmed for most of the disclosure categories, while that of systematic risk is consistently confirmed for all environmental disclosure categories.

5.3.3.2 GLS Regression Analysis

Generalized Least Squares (GLS) longitudinal panel regression with robust standard error is carried out to further test the research hypotheses and to attest the reliability of the main OLS regression results. GLS is a technique for estimating the unknown parameters in a linear regression model. GLS is applied when the variances of the observations are unequal or when there is a certain degree of correlation between the observations. Unequal variances may exist due to the presence of outliers and skewness. In this regard, it is preferable to give less weight for observations arising from populations with greater variability than the weight given for observations from populations with smaller variability. However, OLS does not make use of the information pertaining to the unequal variability of the dependent variable as it assigns equal weight to each observation (See Gujarati, 2003).

The advantage of panel data regression is that it takes the time effect into account. The robust standard error option is applied in order to adjust the GLS parametric test to fit with non-parametric data, as shown by the descriptive statistics indicating that the study's data are not normally distributed. The results of the Generalized Least Squares (GLS) regression of corporate governance on environmental disclosure quantity are shown in Table 5.12.

Table 5.12
GLS Longitudinal Panel Regression With Robust Standard Error Of Corporate Governance On Environmental Disclosure Quantity

	TED		**EP**		**PPEI**		**CELS**		**EA**		**S**		**OEI**	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Intercept	-5.34	0.369	-11.77	0.114	16.97	0.131	15.95	0.281	28.03***	0.004	-99.45***	0.000	-10.59***	0.000
BI	-0.09***	0.001	-0.11***	0.000	-0.01	0.858	-0.12	0.310	-0.10	0.232	0.00	0.944	-0.16***	0.000
RD	-11.19***	0.000	-7.60***	0.000	-16.63***	0.000	-13.87***	0.004	-13.08	0.161	-8.86**	0.030	-9.98***	0.000
BS	-0.50	0.118	-0.25	0.453	-1.15*	0.069	-0.60*	0.072	-0.68*	0.051	0.23	0.603	-0.33	0.111
BM	0.47***	0.000	0.35**	0.028	-0.01	0.770	1.31***	0.000	0.68	0.127	0.63*	0.082	0.66***	0.000
E	0.06*	0.057	0.09***	0.003	0.04	0.237	0.03	0.480	-0.12*	0.072	0.14	0.163	0.06***	0.007
CI	0.01	0.705	0.03	0.105	-0.02	0.275	0.01	0.789	-0.01	0.825	0.07**	0.022	-0.02	0.362
CD	0.04***	0.001	0.06***	0.000	-0.05***	0.005	0.14***	0.000	0.23***	0.000	0.18***	0.000	-0.01	0.829
CERP	4.74***	0.000	1.47**	0.039	8.47***	0.000	4.71***	0.000	12.23***	0.000	4.68***	0.000	4.95***	0.000
ACI	0.18**	0.015	0.12	0.147	0.35***	0.000	0.15	0.346	0.13***	0.000	0.44***	0.002	0.06**	0.028
RCI	-0.07	0.231	-0.04	0.479	-0.15***	0.007	-0.09	0.601	0.07	0.257	-0.22*	0.077	0.02	0.553
NCI	-0.05**	0.035	-0.04**	0.036	-0.11***	0.000	-0.02	0.633	-0.05	0.444	-0.05	0.597	0.01	0.645
OC	-0.09***	0.000	-0.07***	0.005	-0.03	0.676	-0.15***	0.000	0.22*	0.085	-0.06	0.337	-0.23***	0.000
IO	0.07***	0.002	0.09***	0.000	-0.04	0.565	0.01	0.779	-0.17	0.300	0.06	0.150	0.23***	0.000
SZ	4.77***	0.000	5.46***	0.000	4.54**	0.023	0.26	0.909	5.11***	0.001	13.63***	0.000	4.06***	0.000
IND	4.69***	0.000	6.23***	0.000	2.14**	0.043	6.45***	0.002	3.90***	0.001	4.81***	0.000	3.85***	0.000
PRO	1.83**	0.015	1.97*	0.066	1.17	0.308	-0.83	0.600	1.27	0.202	5.52	0.129	2.99***	0.000
LEV	0.95***	0.000	2.44***	0.000	-1.63***	0.008	1.51*	0.067	2.56	0.229	-1.44	0.433	1.40**	0.028
LIQ	0.78***	0.008	0.20	0.239	-0.67	0.108	7.39***	0.000	-0.34	0.816	0.60	0.670	-0.09	0.906
SR	0.01	0.996	0.23	0.822	-0.94	0.622	2.84	0.297	-3.25*	0.081	-2.61	0.600	0.28	0.416
CL	-1.72**	0.015	-1.68***	0.009	-1.31	0.371	-2.00	0.595	-1.30	0.712	1.90	0.321	-3.15***	0.005
Adjusted R^2 (%)	21.40		19.53		11.33		10.93		14.45		23.02		16.17	

***$p \leq 0.01$, **$p \leq 0.05$, and *$p \leq 0.10$.

TED Total Environmental Disclosure, **EP** Environmental Policies, **PPEI** Product and Process-Related Environmental Issues, **CELS** Compliance with Environmental Laws and Standards, **EA** Environmental Auditing, **S** Sustainability, **OEI** Other Environmentally-Related Information, **BI** Board Independence, **RD** Role Duality, **BS** Board Size, **BM** Board Meetings, **E** Education, **CI** Community Influence, **CD** Cross-Directorships, **CERP** Corporate Environmental Responsibility (CER) Committee Presence, **ACI** Audit Committee Independence, **RCI** Remuneration Committee Independence, **NCI** Nomination Committee Independence, **OC** Ownership concentration, **IO** Institutional Ownership, **SZ** Size, **IND** Industry, **PRO** Profitability, **LEV** Leverage, **LIQ** Liquidity, **SR** Systematic Risk, **CL** Cross-Listing.

Table 5.12 presents the results of Generalized Least Squares (GLS) longitudinal panel regression with robust standard error of corporate governance on environmental disclosure quantity. Results show a significant positive association between total environmental disclosure quantity and each of board meetings ($p \leq 0.01$), directors' education ($p \leq 0.10$), cross-directorships ($p \leq 0.01$), the presence of corporate environmental responsibility (CER) committee ($p \leq 0.01$), audit committee independence ($p \leq 0.05$) and institutional ownership ($p \leq 0.01$). Results also indicate a strong significant negative association of total environmental disclosure quantity with each of board independence ($p \leq 0.01$), role duality ($p \leq 0.01$) and ownership concentration ($p \leq 0.01$) and relatively less significant negative association with nomination committee independence ($p \leq 0.05$). However, no significant association is found between total environmental disclosure quantity and each of board size, directors' community influence and remuneration committee independence. The adjusted R Squared of the model is 21.40% indicating that 21.40% of the changes in total environmental disclosure quantity are explained by the changes in its examined determinants.

Regarding the different categories of environmental disclosure, there is a strong significant negative relationship between board independence and disclosure quantity of each of environmental policies ($p \leq 0.01$) and other environmentally-related information ($p \leq 0.01$). Similarly, there is a strong significant negative relationship between role duality and disclosure quantity of each of environmental policies ($p \leq 0.01$), product and process-related environmental issues ($p \leq 0.01$), compliance with environmental laws and standards ($p \leq 0.01$), sustainability ($p \leq 0.05$) and other environmentally-related information ($p \leq 0.01$). However, board size has marginally significant negative association with the disclosure quantity of each of product and process-related environmental issues ($p \leq 0.10$), compliance with environmental laws and standards ($p \leq 0.10$) and environmental auditing ($p \leq 0.10$). There is also a significant positive relationship between board meetings and disclosure quantity of each of environmental policies ($p \leq 0.05$), compliance with environmental laws and standards ($p \leq 0.01$), sustainability ($p \leq 0.10$) and other environmentally-related information ($p \leq 0.01$).

With respect to directors' qualifications and experience, although education has strong significant positive association with the disclosure quantity of each of environmental policies ($p \leq 0.01$) and other environmentally-related information ($p \leq 0.01$), it has only marginally significant negative association with the disclosure quantity of environmental auditing ($p \leq 0.10$). However, community influence is significantly and positively associated with the disclosure quantity of only sustainability ($p \leq 0.05$), while cross-directorships has a persistent strong significant and positive relationship to disclosure quantity of almost all of the disclosure categories including environmental policies ($p \leq 0.01$), compliance with environmental laws and standards ($p \leq 0.01$), environmental auditing ($p \leq 0.01$) and sustainability ($p \leq 0.01$).

Referring to board committees, corporate environmental responsibility (CER) committee presence has a strong significant positive relationship to disclosure quantity of all of the disclosure categories ($p \leq 0.01$), with diminishing impact on environmental policies quantity ($p \leq 0.05$). There is also a significant positive relationship between audit committee independence and disclosure quantity of each of product and process-related environmental issues ($p \leq 0.01$), environmental auditing ($p \leq 0.01$), sustainability ($p \leq 0.01$) and other environmentally-related information ($p \leq 0.05$). However, a significant negative association is detected between remuneration committee independence and the disclosure quantity of each of product and process-related environmental issues ($p \leq 0.01$) and sustainability ($p \leq 0.10$). Similarly, a significant negative relationship is found between nomination committee independence and disclosure quantity of each of environmental policies ($p \leq 0.05$) and product and process-related environmental issues ($p \leq 0.01$).

As for ownership structure, it can be observed that ownership concentration is significantly and negatively associated with disclosure quantity of each of environmental policies ($p \leq 0.01$), compliance with environmental laws and standards ($p \leq 0.01$) and other environmentally-related information ($p \leq 0.01$). However, institutional ownership is found to be significantly and positively associated with disclosure quantity of each of environmental policies ($p \leq 0.01$) and other environmentally-related information ($p \leq 0.01$).

Results also reveal a significant positive relationship between total environmental disclosure quantity and corporate characteristics including company size ($p \leq 0.01$),

industry ($p \leq 0.01$), profitability ($p \leq 0.05$), leverage ($p \leq 0.01$) and liquidity ($p \leq 0.01$), while a significant negative relationship to cross-listing ($p \leq 0.05$). No significant relationship is detected between total environmental disclosure quantity and systematic risk. Concerning environmental disclosure categories, the results confirmed the significant positive association of company size with disclosure quantity of almost all disclosure categories. It is also observed that disclosure quantity of all environmental disclosure categories has significant relationship ($p \leq 0.01$) with industry. However, for the other corporate characteristics including profitability, leverage, liquidity and cross-listing, the results partially supported the insignificant relationship to the quantity of some of the disclosure categories. Nevertheless, the insignificant relationship of systematic risk to disclosure quantity is confirmed for most of the environmental disclosure categories.

5.3.4 Discussion Of Statistical Results

A variety of statistical tests and analyses, including descriptive statistics, correlation analysis and regression analysis, are undertaken in order to measure the extent and trend in corporate environmental disclosure quantity and to examine the relationship between corporate governance mechanisms and the quantity of corporate environmental disclosure practices in UK companies' annual reports, while controlling for corporate characteristics. The results of the different statistical analyses are discussed and analyzed in terms of the theoretical framework adopted and conclusions are drawn from statistical findings.

The results of the descriptive statistics showed that there is a relatively low level of corporate environmental disclosure quantity in the UK (38.44%), indicating the relative existence of an information gap or information asymmetry problem. This, in turn, implies that managers are having more information than stakeholders that they may use for their own interests, which might be at the expense of the interests of the other stakeholders. Although the average environmental disclosure quantity is relatively low, there is an increasing trend in the quantity of environmental disclosure practices over the study period. Such an increasing trend over time emphasizes the increased awareness of corporate environmental responsibility by UK listed

companies. This increase is associated with the general increase in corporate reporting as guided by the recommendations set by professional accounting bodies and standard setters such as Global Reporting Initiative (GRI). In addition, increased corporate environmental responsibility can be attributed to the adoption of the relevant codes of best practice following the issuance of the Combined Code (2003) of corporate governance in the UK.

Moreover, environmental auditing disclosure steadily represents the highest disclosure quantity level of 89.19%, indicating that companies are using this sort of disclosure as an effective tool in assuring the credibility of environmental practices and, hence, demonstrating environmental commitment and accountability to various stakeholders. On the other hand, other environmentally-related information disclosure represents the lowest disclosure quantity level of 23.47%. This result can be attributed to the nature of this disclosure category that includes environmental information not being addressed under any of the other environmental disclosure main categories. In addition, the maximum average disclosure quantity is 76.47%, while the minimum average disclosure quantity is 0%, indicating a great variation in the quantity of environmental disclosure practices among the sample companies. This finding might be the effect of examining a wide range of companies with different sizes and varying degrees of environmental sensitivity as indicated by the descriptive statistics of corporate characteristics.

Descriptive statistics of the different corporate governance mechanisms examined are considered to be reasonable following the issuance of the Combined Code (2003) of corporate governance in the UK. It may be worth mentioning that although the code is voluntary, in that it provides only guidelines of best practice of corporate governance, London Stock Exchange listing rules require companies to adhere to corporate governance principals. UK listed companies follow the Combined Code's (2003) rule of “comply or explain”, with small companies having an excuse for noncompliance if adherence is infeasible or impractical. This is particularly true given the wide variation in most corporate governance mechanisms, ranging from a minimum of 0 to a maximum of 100%. Such great variation can also be attributed to the unfamiliarity by some companies with the adequate application of the principles of the newly issued code succeeding the period under investigation.

The results of both correlation and regression analyses revealed a significant association between environmental disclosure quantity and most corporate governance mechanisms. Seven corporate governance variables were found to be statistically significant in impacting upon overall corporate environmental disclosure quantity, while controlling for corporate characteristics. Specifically, higher environmental disclosure quantity is associated with lower percentage of independent non-executive directors on the board, separation of the dual role of CEO and chairman, higher frequency of board meetings, greater cross-directorships of board members, presence of board-level corporate environmental responsibility (CER) committee or responsible, lower percentage of independent non-executive directors on the nomination committee and lower ownership concentration. In addition, it appears that other corporate governance mechanisms are significant at some categorical levels of environmental disclosure quantity. In other words, for some disclosure categories, higher environmental disclosure quantity is also associated with higher percentage of directors qualified in business, accounting and/or finance, higher percentage of independent non-executive directors on the audit committee and higher percentage of institutional ownership. Neither board size, community influence nor remuneration committee independence shows a significant association with environmental disclosure quantity, although the positive relationships are mostly in the expected direction, except for board size where a negative relationship is documented.

The adjusted R Squared of the regression model is 20.35% indicating that 20.35% of the changes in total environmental disclosure quantity is explained by the changes in its examined determinants. The value of R Squared is considered acceptable in comparison to the findings of previous environmental disclosure literature. For example, the reported R Squared is comparable to that of Halme and Huse (1997) as 21.2%, Peters and Romi (2011) as 25% and Post *et al.* (2011) as 24%. In the context of social disclosures, the reported R Squared is comparable to that of Ghazali (2007) as 27% and Hossain and Reaz (2007) as 25.6%, while in the context of voluntary disclosures in general, the reported R Squared is comparable to that of Gul and Leung (2004) as 19% and Lim *et al.* (2007) as 19.33%.

The proportion of independent non-executive directors on the board is significantly and negatively associated with total environmental disclosure quantity as well as with

the disclosure quantity of each of environmental policies and other environmentally-related information. While this result is contrary to expectation, it suggests that where companies lack board independence, they mitigate the agency problems associated with this lack of independence by providing more environmental disclosures, so that stakeholders' rights to information are not affected. Another possible explanation for this finding may be inadequate application of corporate governance code during the period of this study as the code was newly emerged. In this regard, directors' true independence may be questionable and the existence of grey directors on the board might be problematic. Accordingly, directors' tenure should be taken into consideration when assessing board independence. Otherwise, decisions tuning occurs which might not be in the best interests of stakeholders. However, this result is consistent with the findings of Barako *et al.* (2006) and Haniffa and Cooke (2002), who provide evidence of negative association of outside directors on the board to voluntary disclosure. Although Brammer and Pavelin (2006) were unable to confirm a significant relationship, Post *et al.* (2011) documented a positive association between the proportion of independent non-executive directors and environmental disclosures.

Role duality showed a strong significant negative association with total environmental disclosure quantity as well as with the disclosure quantity of each of environmental policies, product and process-related environmental issues, compliance with environmental laws and standards and other environmentally-related information. In line with the stakeholder-agency theoretical framework adopted, the separation of the dual roles of CEO and chairman is likely to provide necessary checks and balances over management's performance (Fama and Jensen, 1983) and, accordingly, decrease the possibility of restricting information flow (McKendall *et al.*, 1999) and withholding unfavorable information from reaching stakeholders (Ho and Wong, 2001). This result is consistent with earlier evidence on the relationship of role duality to voluntary disclosure (e.g. Gul and Leung, 2004; Huafang and Jianguo, 2007), although no evidence exists of such relationship to environmental disclosure (e.g. Al Arussi *et al.*, 2009; Michelon and Parbonetti, 2010).

Board size displayed no significant association with total environmental disclosure quantity as well as with the disclosure quantity of all environmental disclosure categories. In addition, such insignificant association is negative, which is contrary to

expectation. A possible explanation for this finding may be the existence of an inverted "U" shaped- relationship to environmental disclosure, with an optimal board size existing midway, as assumed by Cormier *et al.* (2011). Below this optimal board size, there is a positive relation between board size and information asymmetry followed by a negative relationship. Descriptive statistics indicated that large board size has been traditional practice in UK companies over time. Too large or excessively sized boards may be plagued with agency conflicts and monitoring problems. This due to the lack of coordination associated with a large board, which slows down the decision making process and decreases board efficiency (Jensen, 1993; Lipton and Lorsch, 1992; Yermack, 1996). The finding is also in line with the evidence from prior studies, where Halme and Huse (1997) and Michelon and Parbonetti (2010) were unable to confirm a significant relationship of board size to environmental disclosures. Nevertheless, evidence of a positive association between board size and environmental disclosure is documented by Cormier *et al.* (2011).

Board meetings frequency has a significant positive association with total environmental disclosure quantity as well as with the disclosure quantity of each of compliance with environmental laws and standards and other environmentally-related information. This result can be interpreted in the context of the proposed framework, as an increasing board activity, represented by meeting frequency, influences the board's ability to act as an effective monitoring mechanism in mitigating agency conflicts (Xie *et al.*, 2003). Increased monitoring is expected to result in reduced information asymmetry and lower agency costs, thereby increasing disclosures (Nelson *et al.*, 2010). In addition, an active board that meets more often is able to devote more time to issues such as social and environmental responsibility, being reflected in an increased quantity of social and environmental information. Although not previously addressed in environmental disclosure research, Laksmana (2008) documents that a board having more time to meet leads to increased extent of voluntary disclosure and transparency.

Directors' education, although found to have insignificant relationship to total environmental disclosure quantity, is significantly and positively associated with the disclosure quantity of each of environmental policies and other environmentally-related information. An educated manager can have a broader perspective and

superior pattern of thinking and, thus, is more likely understand the wider interests of various stakeholders (Akhtaruddin and Abdur Rouf, 2011; Welford, 2007). However, the insignificance of educational background to overall environmental disclosure quantity and the marginal significance to categorical environmental disclosure quantity suggest the need for directors' environmental education in addition to accounting and/or business education. Currently, no prior empirical evidence exists on the relationship between directors' education and a direct measure of corporate environmental disclosure. However, in the context of voluntary disclosure in general, although Haniffa and Cooke (2002) found insignificant relationship, Akhtaruddin and Abdur Rouf (2011) documented a significant positive association between board members qualified in business and accounting and the extent of voluntary disclosure.

Community influence has insignificant association with total environmental disclosure quantity. This result is confirmed for the disclosure quantity of all of the disclosure categories. Although this finding is contrary to expectation, the positive relationship is in the expected direction as to overall environmental disclosure quantity and the disclosure quantity of some of the disclosure categories. In line with the theoretical framework adopted, community influential directors facilitate information acquisition and processing by establishing contacts with stakeholders, thereby help absorb environmental uncertainty and enhance corporate social and environmental performance (Mallin and Michelon, 2011). However, the relationship of community influence to environmental disclosure might not be evident where other forms of directors' qualifications and experience act as substituting factors affecting information provision. Other possible explanations for this finding are that directors with such community influence and relationship networks could spread themselves too thinly or that they have direct relationships and contacts with stakeholders through which information dissemination takes place as opposed to annual report disclosures. Empirical evidence by Michelon and Parbonetti (2010) showed that the proportion of community influential directors on the board positively affects sustainability, environmental, and strategic disclosure, given that no other forms of directors' qualifications and experience have been employed.

Cross-directorships showed a persistent strong significant and positive relationship to total environmental disclosure quantity as well as to disclosure quantity of almost all

of the disclosure categories including environmental policies, compliance with environmental laws and standards, environmental auditing and sustainability. This result can be interpreted in the context of the proposed framework, as an increasing proportion of directors on the board with cross-directorships better equips boards to carry out their governance roles as directors gain the necessary skills and experience needed to understand and address the wider environmental responsibilities towards various stakeholders. Consequently, cross-directorships have important implications for disclosure practices through greater access to information (Haniffa and Cooke, 2002). This result is consistent with the findings of Haniffa and Cooke (2005) and Rupley *et al.* (2011), who provide evidence of significant positive association between cross-directorships and each of corporate social and environmental disclosures respectively.

The presence of corporate environmental responsibility (CER) committee has a strong significant positive relationship to total environmental disclosure quantity as well as to the disclosure quantity of almost all of the disclosure categories. Consistent with the adopted theoretical framework, companies with a CER committee are more likely to disclose environmental information because the committee members will require management to demonstrate accountability by ensuring that the firm is following well-established environmental reporting guidelines and recommendations. As the CER committee is responsible for ensuring the quality of the company's environmental reporting policies, the establishment of such committee can be regarded as a means of addressing stakeholders' interests and responding to their expectations (Michelon and Parbonetti, 2010; Peters and Romi, 2011). Although McKendall *et al.* (1999), Michelon and Parbonetti (2010) and Rupley *et al.* (2011) were unable to confirm a significant relationship, evidence of the existence of a significant positive association between the presence of a CER committee on the board and corporate environmental disclosures is documented by Hassan (2010) and Peters and Romi (2011).

Audit committee independence, although found to have insignificant relationship to total environmental disclosure quantity, is significantly and positively associated with the disclosure quantity of each of product and process-related environmental issues and sustainability. Independence of the audit committee members can significantly

contribute to the committee's effectiveness (Xie *et al.*, 2003), as it enables the committee to carry out its responsibilities objectively (Abbott *et al.*, 2004). However, a possible explanation for an insignificant relationship to overall environmental disclosure quantity may be due to lack of environmental audit undertaken by companies and, consequently, the role of independent non-executive directors on the audit committee may not be evident. Another possible explanation for this finding can be attributed to the existence of grey directors whose true independence may be questionable. The finding of a significant positive association between audit committee independence and the disclosure quantity of some environmental disclosure categories is in line with earlier evidence by O'Sullivan *et al.* (2008) as to voluntary disclosure practices.

Remuneration committee independence revealed no significant association with total environmental disclosure quantity as well as with the disclosure quantity of all of the disclosure categories. While this result is contrary to expectation, it can be interpreted in terms of a lack of linkage between pay and environmental performance in setting remuneration and, consequently, the role of independent non-executive directors on the remuneration committee may not be evident. Another possible explanation for this finding can be attributed to the existence of grey directors whose true independence may be questionable. However, the positive relationship is in the expected direction as to overall environmental disclosure quantity and the disclosure quantity of most of the disclosure categories, suggesting that managers will act in the best interests of stakeholders by providing the necessary disclosures in order to receive considerable pay and retain their position in the firm. The finding of a positive association between remuneration committee independence and the disclosure quantity of most environmental disclosure categories is in line with earlier evidence by O'Sullivan *et al.* (2008) as to voluntary disclosure practices.

Nomination committee independence is significantly and negatively associated with total environmental disclosure quantity as well as with the disclosure quantity of product and process-related environmental issues. While this result is contrary to expectation, it suggests that agency problems associated with lack of directors' independence on the nomination committee are mitigated by providing more environmental disclosures. Another possible explanation for this finding can be

attributed to the existence of grey directors whose true independence may be questionable. No prior empirical evidence exists on the relationship between nomination committee independence and corporate environmental disclosure. Nevertheless, in the context of voluntary disclosure in general, Cheung *et al.* (2010) found that companies with board-level committees including a nomination committee tend to more transparent.

Ownership concentration showed a strong significant negative association with total environmental disclosure quantity as well as with the disclosure quantity of each of environmental policies, compliance with environmental laws and standards and other environmentally-related information. This result can be interpreted in the context of the proposed framework, as an increasing concentration of ownership in the hands of a few large shareholders is associated with less agency conflicts and, hence, a decreasing likelihood of companies disclosing additional information on their social and environmental performance. This result is consistent with the findings of Brammer and Pavelin (2006) and Cormier *et al.* (2005), who provide evidence of significant negative association of ownership concentration with environmental disclosure quantity in annual reports. Evidence of such relationship is also documented by both Reverte (2009) and Prado-Lorenzo *et al.* (2009) as to corporate social responsibility disclosure and by Barako *et al.* (2006) in the context of corporate voluntary disclosure in general.

Institutional ownership, although found to have insignificant relationship to total environmental disclosure quantity, is significantly and positively associated with the disclosure quantity of each of environmental policies and other environmentally-related information. The positive relationship is in the expected direction, suggesting that institutional investors have strong incentives to monitor corporate disclosure practices and influence corporate values due to their large ownership stake (Barako *et al.*, 2006) and that they may consider environmental issues to be important as a means of long-term value creation (Halme and Huse, 1997; Prado-Lorenzo *et al.*, 2009; Welford, 2007). However, a possible explanation for the existence of an insignificant relationship to overall environmental disclosure quantity may be due to the substantial representation of institutional investors in UK companies' blockholdings. In other words, this result is expected given that institutional ownership constitutes the major

and dominant form of blockholdings. Institutional shareholders, thus, represent a key stakeholder group who are more sophisticated (Guan *et al.*, 2007), have power (O'Sullivan *et al.*, 2008), have access to the information they need (Cormier *et al.*, 2005) and, therefore, can obtain the required information from alternative sources other than corporate disclosure (Berthelot *et al.*, 2003). Another possible explanation for this finding may be due to the lack of stakeholder engagement in the corporate governance process and, consequently, the role of institutional investors in shaping corporate disclosure decisions may not be evident. The finding of a significant positive association between institutional investors and the disclosure quantity of some environmental disclosure categories is in line with earlier evidence by Barako *et al.* (2006) in the context of corporate voluntary disclosures.

Results also reveal a significant positive relationship between total environmental disclosure quantity and corporate characteristics including company size, industry, leverage and liquidity, while a significant negative relationship to cross-listing. No significant relationship is detected between total environmental disclosure quantity and each of profitability and systematic risk. Concerning environmental disclosure categories, the results confirmed the significant positive association of company size with disclosure quantity of most disclosure categories. It is also observed that disclosure quantity of all environmental disclosure categories has significant relationship with industry. However, for the other corporate characteristics including leverage, liquidity and cross-listing, the results are partially supported for some of the disclosure categories. Nevertheless, the insignificant relationship of profitability to disclosure quantity is confirmed for most of the disclosure categories, while that of systematic risk is consistently confirmed for all environmental disclosure categories.

These results are consistent with the dominant trend in previous literature, where the results of the majority of previous studies concerning corporate characteristics indicate that there is a significant positive association between corporate environmental disclosure and each of company size (Adams *et al.*, 1998; Brammer and Pavelin, 2006; Cormier *et al.*, 2011; Cormier *et al.*, 2005; Deegan and Gordon, 1996; Gray *et al.*, 2001; Hackston and Milne, 1996; Magness, 2006; Patten, 2002; Peters and Romi, 2011; Rupley *et al.*, 2011; Stanny and Ely, 2008) and industry (Adams *et al.*, 1998; Brammer and Pavelin, 2006; Campbell, 2004; Cormier *et al.*,

2005; Deegan and Gordon, 1996; García-Ayuso and Larrinaga, 2003; Gray *et al.*, 2001; Hackston and Milne, 1996; Halme and Huse, 1997), while there is no association between corporate environmental disclosure and profitability (Brammer and Pavelin, 2006; García-Sánchez, 2008; Hackston and Milne, 1996; Michelon and Parbonetti, 2010; Peters and Romi, 2011; Stanny and Ely, 2008).

However, results of prior literature on the association of environmental disclosure with other corporate characteristics are mixed. Consistent with the current study's findings, the significant positive association between environmental disclosure and leverage is previously documented by Clarkson *et al.*, 2008; Naser *et al.*, 2006; Parsa and Kouhy, 2008, while that of liquidity is previously documented by Camfferman and Cooke (2002) in the context of corporate disclosure in general. The finding of insignificant association between environmental disclosure and systematic risk is similar to that of García-Ayuso and Larrinaga (2003) and Michelon and Parbonetti (2010). Nevertheless, the significant negative association between environmental disclosure and cross-listing is in line with earlier evidence by Hope *et al.* (2011) who indicated that more stringent disclosure requirements as a result of cross-listing in highly organized stock exchanges are likely reduce voluntary disclosures.

From the above discussion, it can be noticed that there is a high level of agreement between the results of OLS and GLS regressions about the significance of corporate governance variables as well as corporate characteristics variables. Similar GLS regression results are found as in the previous OLS regression analysis. Although the significance of additional corporate governance mechanisms, including directors' education, audit committee independence and institutional ownership, is detected in impacting upon total environmental disclosure quantity, such significance was already documented in terms of categorical environmental disclosure quantity in the OLS regression analysis. Nevertheless, the different regression analyses agree as to the direction of such relationships. Generally, the results of the GLS regression are largely consistent with results and findings of the main OLS regression.

Accordingly, the results of the panel regression analysis agree with the research hypotheses regarding the existence of a significant positive relationship between environmental disclosure quantity and each of board meetings (H_{4a}), cross-directorships (H_{7a}), and the presence of corporate environmental responsibility (CER)

committee (H_{8a}), while a negative significant relationship to each of role duality (H_{2a}) and ownership concentration (H_{12a}). However, results partially support the research hypotheses regarding the association between environmental disclosure quantity and each of each of board independence (H_{1a}) and nomination committee independence (H_{11a}), in that the relationships are significant although the negative association is contrary to expectation. In addition, research hypotheses regarding the significant positive relationship of environmental disclosure quantity to other corporate governance mechanisms, including directors' education (H_{5a}), audit committee independence (H_{9a}) and institutional ownership (H_{13a}), are partially supported at some categorical levels of environmental disclosure quantity. Moreover, the results partially support the research hypotheses regarding the association between environmental disclosure quantity and each of community influence (H_{6a}) and remuneration committee independence (H_{10a}), in that the positive relationships are in the expected direction although they are insignificant. Nevertheless, the research hypothesis regarding the association between environmental disclosure quantity and board size (H_{3a}) is totally unsupported as the relationship is neither positive nor significant.

Furthermore, the results of the panel regression analysis agree with most of the research hypotheses concerning the variability in the relationship of each of the corporate governance mechanisms to disclosure quantity among the different environmental disclosure categories. Specifically, the relationship between environmental disclosure quantity and each of board independence (H_{1b}), role duality (H_{2b}), board meetings (H_{4b}), directors' education (H_{5b}), directors' community influence (H_{6b}), cross-directorships (H_{7b}), audit committee independence (H_{9b}), remuneration committee independence (H_{10b}), nomination committee independence (H_{11b}), ownership concentration (H_{12b}) and institutional ownership (H_{13b}) differs among the different categories of environmental disclosure. However, the research hypotheses concerning the variability in such relationship are not relatively supported for each of board size (H_{3b}) and the presence of corporate environmental responsibility (CER) committee (H_{8b}). In other words, consistent relationships among almost all of the different environmental disclosure categories were documented, wherein disclosure quantity has dominant insignificant negative association with board size and persistent significant positive association with corporate environmental responsibility (CER) committee presence.

In conclusion, the overall results provide support for the study's general argument that corporate governance plays an important role in determining how companies mitigate agency problems and respond to the needs and interests of various stakeholder groups and, consequently, in determining the quantity of environmental disclosures in the annual reports. In this respect, sound systems of corporate governance are serving as both monitoring and accountability mechanisms, by which managers' opportunistic manipulation is controlled and companies are made responsive to the rights and needs of stakeholders, thereby reducing information asymmetry or the information expectation gap. In other words, the stakeholder-agency theoretical framework adopted by the current study is greatly supported by the study's findings.

5.3.5 Sensitivity Analysis

A number of sensitivity tests are performed to check the robustness of the main analysis and, hence to attest the reliability of the results. Sensitivity analysis is aimed at examining how sensitive the results and findings towards using alternative model specifications or changing the statistical tests in the determination environmental disclosure quantity. Two types of robustness check are undertaken. First, in addition to using a composite measure of environmental disclosure quantity, the different categories of environmental disclosures are integrated into the analysis in order to better portray the different areas and aspects of the company's disclosure strategy. Second, alternative regression analyses are carried out to check the sensitivity of the main statistical regression test. Hence, in addition to the main Ordinary Least Squares (OLS) regression analysis, Generalized Least Squares (GLS) regression analysis is also undertaken to allow for possible unequal variances of the observations as well as for any potential degree of correlation between the observations. Moreover, sensitivity analysis using pooled cross-sectional Ordinary Least Squares (OLS) regression with robust standard error is employed as a robustness check of the main regression analysis.

While a composite or summary measure, that collapses different disclosure categories into a single value, is useful in associating disclosure quantity with other variables of interest, the analysis of the different disclosure categories provide deeper

understanding of and richer insights into disclosure quantity (see Beattie *et al.*, 2004), thereby help to comprehensively profile the disclosure strategies adopted by the company (Beretta and Bozzolan, 2004). Aggregated measures shift attention away from what is and what is not being reported in terms of the different themes or items being reported (Chapman and Milne, 2004). Accordingly, the current study reports both aggregated quantity and disaggregated categorical quantity of environmental disclosures. Environmental disclosure quantity of each of the different disclosure categories is used alternatively as the dependent variable. Corporate governance mechanisms are then regressed on total environmental disclosure quantity as well as the disclosure quantity of each of the different disclosure categories. In this regard, the break down of environmental disclosure quantity provides a better overall picture of the governance relation to disclosure quantity. Taken together, results from these various specifications are largely consistent with total regression results. In other words, although the relationship of corporate governance to disclosure quantity differs across different disclosure categories, results do not alter the main inferences drawn from total environmental disclosure quantity model reported findings.

Generalized Least Squares (GLS) regression analysis is also undertaken to allow for possible unequal variances of the observations as well as for any potential degree of correlation between the observations. GLS regression analysis makes use of the information pertaining to the unequal variability of the dependent variable as opposed to OLS regression analysis that assigns equal weight to each observation (See Gujarati, 2003). Similar results are found as in the previous OLS regression analysis. Although the significance of additional corporate governance mechanisms is detected in impacting upon total environmental disclosure quantity, such significance was already documented in terms of categorical environmental disclosure quantity in the OLS regression analysis. Generally, the results and findings are largely consistent with results of the main OLS regression. Moreover, sensitivity analysis using pooled cross-sectional Ordinary Least Squares (OLS) regression with robust standard error is employed as a robustness check of the main regression analysis. Contrary to panel data analysis, pooled regression analysis deals with large number of observations as one unit without differentiating between the different groups of data. The results of the pooled cross-sectional Ordinary Least Squares (OLS) regression of corporate governance on environmental disclosure quantity are shown in Table 5.13.

Table 5.13
Pooled Cross Sectional OLS Regression With Robust Standard Error Of Corporate Governance On Environmental Disclosure Quantity

	TED		EP		PPEI		CELS		EA		S		OEI	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Intercept	-5.34	0.490	-11.77	0.133	16.97	0.158	15.95	0.344	28.03	0.116	-99.45***	0.000	-10.59	0.224
BI	-0.09	0.123	-0.11*	0.065	-0.01	0.926	-0.12	0.370	-0.10	0.326	0.00	0.977	-0.16**	0.019
RD	-11.19***	0.001	-7.60**	0.020	-16.63***	0.000	-13.87**	0.015	-13.08	0.191	-8.86	0.146	-9.98***	0.002
BS	-0.50**	0.048	-0.25	0.343	-1.15***	0.003	-0.60	0.322	-0.68	0.205	0.23	0.677	-0.33	0.269
BM	0.47**	0.027	0.35*	0.081	-0.01	0.968	1.31***	0.003	0.68*	0.073	0.63	0.180	0.66**	0.010
E	0.06**	0.040	0.09***	0.004	0.04	0.414	0.03	0.686	-0.12	0.101	0.14**	0.033	0.06*	0.082
CI	0.01	0.802	0.03	0.169	-0.02	0.468	0.01	0.874	-0.01	0.909	0.07	0.141	-0.02	0.461
CD	0.04	0.105	0.06**	0.020	-0.05	0.306	0.14**	0.031	0.23***	0.001	0.18***	0.002	-0.01	0.781
CERP	4.74***	0.000	1.47	0.196	8.47***	0.000	4.71**	0.047	12.23***	0.000	4.68*	0.060	4.95***	0.000
ACI	0.18***	0.001	0.12**	0.049	0.35***	0.000	0.15	0.220	0.13	0.297	0.44***	0.000	0.06	0.347
RCI	-0.07	0.103	-0.04	0.426	-0.15**	0.039	-0.09	0.323	0.07	0.396	-0.22**	0.012	0.02	0.742
NCI	-0.05	0.154	-0.04	0.307	-0.11**	0.043	-0.02	0.784	-0.05	0.420	-0.05	0.459	0.01	0.829
OC	-0.09*	0.092	-0.07	0.185	-0.03	0.766	-0.15	0.177	0.22*	0.066	-0.06	0.593	-0.23***	0.000
IO	0.07	0.217	0.09*	0.094	-0.04	0.704	0.01	0.929	-0.17	0.175	0.06	0.585	0.23***	0.000
SZ	4.77***	0.000	5.46***	0.000	4.54***	0.008	0.26	0.922	5.11**	0.031	13.63***	0.000	4.06***	0.001
IND	4.69***	0.000	6.23***	0.000	2.14	0.215	6.45***	0.007	3.90*	0.057	4.81**	0.036	3.85***	0.001
PRO	1.83	0.209	1.97	0.172	1.17	0.612	-0.83	0.789	1.27	0.736	5.52*	0.057	2.99*	0.067
LEV	0.95	0.325	2.44**	0.020	-1.63	0.279	1.51*	0.431	2.56	0.182	-1.44	0.468	1.40	0.159
LIQ	0.78	0.214	0.20	0.753	-0.67	0.488	7.39***	0.000	-0.34	0.822	0.60	0.708	-0.09	0.914
SR	0.01	0.996	0.23	0.879	-0.94	0.676	2.84	0.369	-3.25*	0.180	-2.61	0.442	0.28	0.858
CL	-1.72	0.237	-1.68	0.291	-1.31	0.596	-2.00	0.586	-1.30	0.670	1.90	0.612	-3.15*	0.079
R^2 (%)	21.40		19.53		11.33		10.93		14.45		23.02		16.17	

***$p \leq 0.01$, **$p \leq 0.05$, and *$p \leq 0.10$.

TED Total Environmental Disclosure, **EP** Environmental Policies, **PPEI** Product and Process-Related Environmental Issues, **CELS** Compliance with Environmental Laws and Standards, **EA** Environmental Auditing, **S** Sustainability, **OEI** Other Environmentally-Related Information, **BI** Board Independence, **RD** Role Duality, **BS** Board Size, **BM** Board Meetings, **E** Education, **CI** Community Influence, **CD** Cross-Directorships, **CERP** Corporate Environmental Responsibility (CER) Committee Presence, **ACI** Audit Committee Independence, **RCI** Remuneration Committee Independence, **NCI** Nomination Committee Independence, **OC** Ownership concentration, **IO** Institutional Ownership, **SZ** Size, **IND** Industry, **PRO** Profitability, **LEV** Leverage, **LIQ** Liquidity, **SR** Systematic Risk, **CL** Cross-Listing.

Table 5.13 displays the results of pooled cross-sectional Ordinary Least Squares (OLS) regression with robust standard error of corporate governance on environmental disclosure quantity. The results of the pooled regression showed approximately the same R Squared as the panel data regression analysis indicating that the pooled regression has the same strength of the main panel regression. Similar results are found as in the panel data regression analysis.

Although the significance of additional corporate governance mechanisms, including directors' education and audit committee independence, is detected in impacting upon total environmental disclosure quantity, such significance was already documented in terms of categorical environmental disclosure quantity in the main regression analysis. An exception is the arising significance of board size with total environmental disclosure quantity; however it is still not being supported by almost all of environmental disclosure categories. While the significance of other corporate governance mechanisms, such as board independence, cross-directorships and nomination committee independence, to total environmental disclosure quantity is marginally diminishing, evidence of such significance still exists in terms of categorical environmental disclosure quantity. Nevertheless, the different regression analyses agree as to the direction of such relationships. Generally, the results and findings are largely consistent with results of the main OLS regression. Accordingly, the pooled regression indicates that the results of the panel data analysis are not sensitive to changing the type of statistical test employed. Moreover, the selected panel data analysis is well fitted with the examined data.

In summary, these sensitivity analyses show general consistency with the overall findings. Taken together, the results of using alternative model specifications as well as the results of changing the statistical tests in the determination environmental disclosure quantity do not alter the main inferences drawn from the reported findings of the aggregate model specification and the main statistical analysis. In this regard, the sensitivity analysis confirms the reliability of the results and findings and, hence, supports the generalization of such results.

5.4 CONCLUSION

This chapter presents the first part of the empirical work aimed at quantitatively investigating the relationship between corporate governance mechanisms and the quantity of corporate environmental disclosure practices in UK companies' annual reports. A variety of statistical tests and analyses, including descriptive statistics, correlation analysis and regression analysis, are undertaken in order to measure the extent and trend in corporate environmental disclosure quantity and to examine the relationship in question, while controlling for corporate characteristics. Finally, sensitivity analysis is carried out to check the robustness of the main regression analysis. The results are discussed and analyzed in terms of the theoretical framework adopted and conclusions are drawn from statistical findings.

Descriptive statistics showed that there is a relatively low level of corporate environmental disclosure quantity in the UK, indicating the relative existence of an information gap or information asymmetry problem. However, there is an increasing trend in the quantity of environmental disclosure practices over the study period, emphasizing the increased awareness of corporate environmental responsibility by UK listed companies over time. Moreover, environmental auditing disclosure steadily represents the highest disclosure quantity level, while other environmentally-related disclosure represents the lowest disclosure quantity level. In addition, there is a great variation in the quantity of environmental disclosure practices among the sample companies. This finding might be the effect of examining a wide range of companies with different sizes and varying degrees of environmental sensitivity as indicated by the descriptive statistics of corporate characteristics. Descriptive statistics of corporate governance mechanisms are considered reasonable following the issuance of the Combined Code (2003) of corporate governance in the UK.

Results also revealed a significant association between environmental disclosure quantity and most corporate governance mechanisms. Specifically, higher environmental disclosure quantity is associated with lower percentage of independent non-executive directors on the board, separation of the dual role of CEO and chairman, higher frequency of board meetings, greater cross-directorships of board members, presence of board-level corporate environmental responsibility (CER) committee or responsible, lower percentage of independent non-executive directors on

the nomination committee and lower ownership concentration. In addition, it appears that other corporate governance mechanisms are significant at some categorical levels of environmental disclosure quantity. In other words, for some disclosure categories, higher environmental disclosure quantity is also associated with higher percentage of directors qualified in business, accounting and/or finance, higher percentage of independent non-executive directors on the audit committee and higher percentage of institutional ownership. Neither board size, community influence nor remuneration committee independence shows a significant association with environmental disclosure quantity, although the positive relationships are mostly in the expected direction, except for board size where a negative relationship is documented.

In conclusion, the overall results reinforce the study's general argument that corporate governance plays an important role in determining how companies mitigate agency problems and respond to the needs and interests of various stakeholder groups and, consequently, in determining the quantity of environmental disclosures in the annual reports. The significant association between environmental disclosure quantity and most corporate governance characteristics indicates the appropriate application of the corporate governance concepts in the UK context following the launching of the new paradigm in the corporate governance code, which in turn supports the level of environmental disclosure. In this respect, sound systems of corporate governance are serving as both monitoring and accountability mechanisms, by which managers' opportunistic manipulation is controlled and companies are made responsive to the rights and needs of stakeholders, thereby reducing information asymmetry or the information expectation gap. In other words, the stakeholder-agency theoretical framework adopted by the current study is greatly supported by the study's findings.

However, research should not be confined to the examination of the impact of governance mechanisms on the quantity of environmental disclosures only, rather than a consideration of the quality of the disclosed information as well. Focusing on the quantity of disclosures does not mean that such disclosures are of higher quality so as to reflect the true state of the company's disclosure strategies. Therefore, the next chapter is devoted to empirically examining the relationship between corporate governance mechanisms and the quality of corporate environmental disclosure in the annual reports of UK companies.

Chapter 6

EXAMINING THE RELATIONSHIP BETWEEN ENVIRONMENTAL DISCLOSURE QUALITY AND CORPORATE GOVERNANCE

CHAPTER SIX

EXAMINING THE RELATIONSHIP BETWEEN ENVIRONMENTAL DISCLOSURE QUALITY AND CORPORATE GOVERNANCE

6.1 INTRODUCTION

Determining the research methodology, deciding on the relevant philosophical assumptions and methodological choices, and constructing the appropriate research design, portray the necessary steps for proceeding in the empirical study. Based on stakeholder-agency theory, the main objectives of the present study is to empirically examine the relationship between corporate governance mechanisms and the quantity and quality of corporate environmental disclosure practices in UK companies' annual reports and to provide an in-depth investigation of environmental disclosure quality assessment.

This chapter constitutes the second part of the empirical work aimed at quantitatively investigating the relationship between corporate governance mechanisms and the quality of corporate environmental disclosure practices in UK companies' annual reports. It commences with carrying out some descriptive analyses of the variables of interest to measure the quality of corporate environmental disclosure practices in the annual reports and its trend over time. Moreover, correlation analyses are undertaken to detect any autocorrelations among variables. Correlation coefficients are also intended to attest the construct validity of the disclosure measurement. Using regression analysis, the chapter proceeds with testing the hypotheses developed for examining the relationship in question, while controlling for corporate characteristics. Two models are tested in which the dependent variables are total corporate environmental disclosure quality and the quality of disclosure within each disclosure category. Finally, sensitivity analysis is carried out to check the robustness of the main regression analysis. Results are discussed and analyzed in terms of the theoretical framework adopted and conclusions are drawn from statistical findings.

6.2 EXAMINING THE EXTENT AND TREND OF CORPORATE ENVIRONMENTAL DISCLOSURE QUALITY

Corporate environmental disclosure quality indices provide a measure of the extent of total environmental disclosure quality as well as disclosure quality within each disclosure category. These indices are computed for the four years of the study to provide the trend in environmental disclosure practices in the annual reports over time. Descriptive statistics are performed to help carry out the required analyses. Data are panelled by year, along with data pooling in order to permit thorough analysis of total corporate environmental disclosure and each corporate environmental disclosure category. The results of the descriptive statistics for each of the yearly panels as well as the pooled environmental disclosure quality are shown in the following tables.

Table 6.1

Descriptive Statistics Of Environmental Disclosure Quality Panel A: 2004

Variable	Mean (Median)	Standard Deviation	Min. (Max.)	Standard Skewness	Standard Kurtosis
Total Environmental Disclosure	71.74 (72.30)	5.24	45.83 (83.33)	-1.10	5.66
Environmental Policies	71.44 (71.48)	6.19	45.83 (87.50)	-0.69	4.09
Product and Process-Related Environmental Issues	71.38 (70.83)	6.85	50.00 (91.67)	-0.25	3.48
Compliance with Environmental Laws and Standards	74.69 (75.00)	6.92	58.33 (91.67)	-0.43	3.81
Environmental Auditing	70.98 (70.83)	4.15	58.33 (91.67)	-0.01	9.66
Sustainability	72.55 (70.83)	6.97	58.33 (91.67)	0.28	4.15
Other Environmentally-Related Information	73.19 (70.83)	5.68	52.08 (91.67)	-0.09	5.57

Table 6.1 shows the descriptive statistics of total environmental disclosure quality and the quality of environmental disclosure within each of the disclosure categories for the first panel of data for the year 2004. The overall environmental disclosure quality represents 71.74% of the maximum quality of the disclosed checklist items, which varies between 45.83% and 83.33% for the lowest and highest UK companies' disclosure quality respectively. Moreover, compliance with environmental laws and standards disclosure represents the highest disclosure quality of 74.69%, while environmental auditing disclosure represents the lowest disclosure quality of 70.98%. This indicates that compliance with environmental laws and standards is a dominant category of quality environmental disclosure that most companies in the examined sample agree to efficiently disclose.

In addition, statistics reveal that the maximum disclosure quality of 91.67% is presented by product and process-related environmental issues, compliance with environmental laws and standards, environmental auditing, sustainability and other environmentally-related information, which means that at least one company has mostly provided the expected high quality environmental disclosure within these categories. However, environmental policies showed the minimum disclosure quality of 45.83%, which means that at least one of the sample companies has provided such low quality environmental policies disclosure.

The descriptive statistics show the normality of environmental disclosure data. It is observed that the standard skewness of total environmental disclosure quality and that of environmental disclosure quality of all disclosure categories are within the normally distributed range of ±1.96 (Haniffa and Hudaib, 2006). However, the data are considered to be normally distributed if the standard kurtosis statistics fall within the range of ±3 (Haniffa and Hudaib, 2006). Accordingly, environmental disclosure data are not normally distributed, as the standard kurtosis statistics of total environmental disclosure quality and that of all disclosure categories exceed the range of ±3 indicating that such data are not normally distributed. As a consequence, a robust analysis is necessary for any hypotheses test related to the entire data.

Table 6.2

Descriptive Statistics Of Environmental Disclosure Quality Panel B: 2005

Variable	Mean (Median)	Standard Deviation	Min. (Max.)	Standard Skewness	Standard Kurtosis
Total Environmental Disclosure	72.22 (72.79)	4.84	45.83 (85.42)	-1.21	7.11
Environmental Policies	71.95 (71.78)	5.90	45.83 (87.50)	-0.69	5.00
Product and Process-Related Environmental Issues	72.09 (72.22)	6.66	45.83 (91.67)	-0.55	4.22
Compliance with Environmental Laws and Standards	74.61 (75.00)	6.15	58.33 (91.67)	-0.51	4.06
Environmental Auditing	70.99 (70.83)	4.05	58.33 (91.67)	0.15	10.96
Sustainability	73.18 (70.83)	7.52	33.33 (91.67)	-1.16	10.13
Other Environmentally-Related Information	73.67 (73.61)	5.56	58.33 (91.67)	0.07	4.50

Table 6.2 presents the descriptive statistics of total environmental disclosure quality and the quality of environmental disclosure within each of the disclosure categories for the second panel of data for the year 2005. The results indicate that the mean total environmental disclosure quality is 72.22%, which is slightly higher than previous year's level. Moreover, compliance with environmental laws and standards disclosure represents the highest disclosure quality of 74.61%, while environmental auditing disclosure represents the lowest disclosure quality of 70.99%.

Regarding the standard skewness statistics, the presented data are normally distributed. It is observed that the standard skewness of total environmental disclosure quality and that of all disclosure categories are within the range of ±1.96 evidencing the normality of the data (see Haniffa and Hudaib, 2006). This result is not supported

by the standard kurtosis statistics, where the standard kurtosis of total environmental disclosure quality and that of all disclosure categories exceed the normality range of ±3 (see Haniffa and Hudaib, 2006), indicating that such data are not normally distributed.

Table 6.3

Descriptive Statistics Of Environmental Disclosure Quality Panel C: 2006

Variable	Mean (Median)	Standard Deviation	Min. (Max.)	Standard Skewness	Standard Kurtosis
Total Environmental Disclosure	72.90 (73.61)	5.00	45.83 (85.91)	-1.63	8.56
Environmental Policies	72.83 (72.92)	6.19	45.83 (86.46)	-0.73	4.64
Product and Process-Related Environmental Issues	72.97 (73.33)	6.94	45.83 (91.67)	-0.63	4.43
Compliance with Environmental Laws and Standards	74.55 (75.00)	6.25	50.00 (91.67)	-0.90	4.69
Environmental Auditing	71.39 (70.83)	4.13	58.33 (91.67)	0.36	9.21
Sustainability	73.74 (70.83)	6.36	58.33 (91.67)	0.07	4.36
Other Environmentally-Related Information	73.82 (75.00)	5.97	45.83 (91.67)	-0.62	6.18

Table 6.3 shows the descriptive statistics of total environmental disclosure quality and the quality of environmental disclosure within each of the disclosure categories for the third panel of data for the year 2006. The overall environmental disclosure quality represents 72.90% of the maximum quality of the disclosed checklist items, which is higher than the level of the previous two years. Moreover, compliance with environmental laws and standards disclosure represents the highest disclosure quality

of 74.55%, while environmental auditing disclosure represents the lowest disclosure quality of 71.39%.

Regarding the standard skewness statistics, the presented data are normally distributed. It is observed that the standard skewness of total environmental disclosure quality and that of all disclosure categories are within the range of ±1.96 evidencing the normality of the data (see Haniffa and Hudaib, 2006). This result is not supported by the standard kurtosis statistics, where the standard kurtosis of total environmental disclosure quality and that of all disclosure categories exceed the normality range of ±3 (see Haniffa and Hudaib, 2006), indicating that such data are not normally distributed. As a consequence, a robust analysis is necessary for any hypotheses test related to the entire data.

Table 6.4

Descriptive Statistics Of Environmental Disclosure Quality Panel D: 2007

Variable	Mean (Median)	Standard Deviation	Min. (Max.)	Standard Skewness	Standard Kurtosis
Total Environmental Disclosure	74.07 (74.38)	4.66	47.40 (86.27)	-1.09	7.66
Environmental Policies	74.34 (74.36)	5.78	48.96 (88.02)	-0.55	4.29
Product and Process-Related Environmental Issues	74.81 (75.83)	6.58	45.83 (91.67)	-0.72	4.60
Compliance with Environmental Laws and Standards	74.29 (75.00)	6.46	45.83 (91.67)	-0.77	5.24
Environmental Auditing	72.72 (70.83)	5.36	58.33 (91.67)	0.91	6.38
Sustainability	73.90 (70.83)	6.74	58.33 (91.67)	0.28	3.96
Other Environmentally-Related Information	73.66 (73.61)	5.50	58.33 (91.67)	-0.18	4.61

Table 6.4 presents the descriptive statistics of total environmental disclosure quality and the quality of environmental disclosure within each of the disclosure categories for the fourth panel of data for the year 2007. The results show that the mean total environmental disclosure quality is 74.07% of the maximum quality of the disclosed checklist items, which varies between 47.40% and 86.27% for the lowest and highest UK companies disclosures respectively. This disclosure quality is higher than the quality of the previous three years, indicating an increased awareness of corporate environmental responsibility. Moreover, product and process-related environmental issues disclosure represents the highest disclosure quality of 74.81%, while environmental auditing disclosure represents the lowest disclosure quality of 72.72%. Product and process-related environmental issues disclosure is expected to accurately reveal any damage to the environment resulting from the manufacturing or use of products as well as environmental protection resulting from improvements in the products or their processing. However, environmental auditing disclosure is the product of the environmental auditing process that is characterized by its diversity due to "lack of mandatory regulation, sketchy adoption of voluntary guidelines, and variable quality of verification" (Hammond and Miles, 2004).

In addition, statistics indicate that the maximum disclosure quality of 91.67% is presented by product and process-related environmental issues, compliance with environmental laws and standards, environmental auditing, sustainability and other environmentally-related information. However, product and process-related environmental issues and compliance with environmental laws and standards showed the minimum disclosure quality of 45.83%.

Regarding the standard skewness statistics, the presented data are normally distributed. It is observed that the standard skewness of total environmental disclosure quality and that of all disclosure categories are within the range of ±1.96 evidencing the normality of the data (see Haniffa and Hudaib, 2006). This result is not supported by the standard kurtosis statistics, where the standard kurtosis of total environmental disclosure quality and that of all disclosure categories exceed the normality range of ±3 (see Haniffa and Hudaib, 2006), indicating that such data are not normally distributed. As a consequence, a robust analysis is necessary for any hypotheses test related to the entire data.

Table 6.5

Descriptive Statistics Of Pooled Environmental Disclosure Quality

Variable	Mean (Median)	Standard Deviation	Min. (Max.)	Standard Skewness	Standard Kurtosis
Total Environmental Disclosure	72.74 (73.21)	5.01	45.83 (86.27)	-1.24	7.02
Environmental Policies	72.65 (72.92)	6.11	45.83 (88.02)	-0.66	4.47
Product and Process-Related Environmental Issues	72.87 (72.92)	6.86	45.83 (91.67)	-0.52	4.02
Compliance with Environmental Laws and Standards	74.52 (75.00)	6.43	45.83 (91.67)	-0.66	4.50
Environmental Auditing	71.54 (70.83)	4.52	58.33 (91.67)	0.61	8.83
Sustainability	73.42 (70.83)	6.88	33.33 (91.67)	-0.20	6.13
Other Environmentally-Related Information	73.60 (73.61)	5.67	45.83 (91.67)	-0.23	5.28

Table 6.5 shows the descriptive statistics of the pooled total environmental disclosure quality and the quality of environmental disclosure within each of the disclosure categories. The overall environmental disclosure quality represents 72.74% of the maximum quality of the disclosed checklist items. It reflects the average increase in the environmental disclosure quality over the period under investigation. The average environmental disclosure quality is considered relatively high. Furthermore, there is a slightly increasing trend in the quality of environmental disclosure practices over the study period. Such an increasing trend over time emphasizes the increased awareness of corporate environmental responsibility by UK listed companies.

Moreover, compliance with environmental laws and standards disclosure steadily represents the highest disclosure quality of 74.52%, given that specific high quality

information is necessary to report on the actions taken by the company in order to show commitment to and conformity with statutory environmental requirements and, hence, accountability to various stakeholders. On the other hand, environmental auditing disclosure represents the lowest disclosure quality of 71.54%. This result is expected given that environmental auditing disclosure is the product of the environmental auditing process that is characterized by "lack of mandatory regulation, sketchy adoption of voluntary guidelines, and variable quality of verification" (Hammond and Miles, 2004).

In addition, the maximum average disclosure quality is 86.27%, while the minimum average disclosure quality is 45.83%, indicating a great variation in the quality of environmental disclosure practices among the sample companies. This finding might be the effect of examining a wide range of companies with different sizes and varying degrees of environmental sensitivity. However, statistics reveal that the maximum disclosure quality of 91.67% is presented by product and process-related environmental issues, compliance with environmental laws and standards, environmental auditing, sustainability and other environmentally-related information, which means that at least one company has mostly provided the expected high quality environmental disclosure within these categories. On the contrary, the minimum disclosure quality is 33.33%, as shown by sustainability, which means that at least one of the sample companies has provided low quality sustainability disclosure.

The descriptive statistics show the normality of environmental disclosure data. It is observed that the standard skewness of total environmental disclosure quality and that of environmental disclosure quality of all disclosure categories are within the normally distributed range of ±1.96 (Haniffa and Hudaib, 2006). However, the data are considered to be normally distributed if the standard kurtosis statistics fall within the range of ±3 (Haniffa and Hudaib, 2006). Accordingly, environmental disclosure data are not normally distributed, as the standard kurtosis statistics of total environmental disclosure quality and that of all disclosure categories exceed the range of ±3 indicating that such data are not normally distributed. As a consequence, a robust analysis is necessary for any hypotheses test related to the entire data.

The extent and trend of corporate environmental disclosure quality are portrayed in Figure 6.1.

Figure 6.1

Extent And Trend Of Corporate Environmental Disclosure Quality

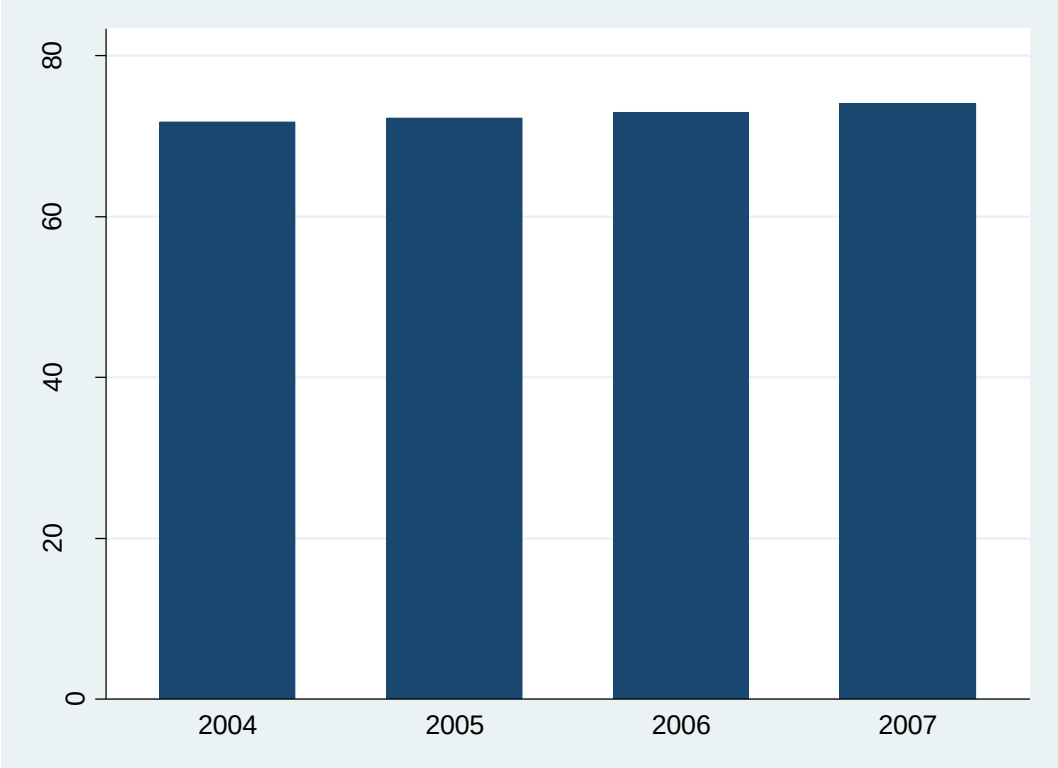


Figure 6.1 depicts the extent of total corporate environmental disclosure quality in each of the sample years, 2004-2007 inclusive. It also shows the trend in the quality of such disclosure over time. The average environmental disclosure quality is considered relatively high. Furthermore, there is a slightly increasing trend in the quality of environmental disclosure practices over the study period, where the mean environmental disclosure quality is 71.74%, 72.22%, 72.90% and 74.07% for each of the four years respectively. Such an increasing trend over time emphasizes the increased awareness of corporate environmental responsibility by UK listed companies. The increased quality is associated with the general increase in corporate reporting as guided by the recommendations set by professional accounting bodies and standard setters such as Global Reporting Initiative (GRI). In addition, increased corporate environmental responsibility can be attributed to the adoption of the relevant codes of best practice following the issuance of the Combined Code (2003) of corporate governance in the UK.

Using a pie chart, the distribution of the total environmental disclosure quality over the sample years is displayed in Figure 6.2, while the distribution of the total environmental disclosure quality over the different disclosure categories is represented in Figure 6.3.

Figure 6.2

Distribution Of Total Environmental Disclosure Quality Over Years

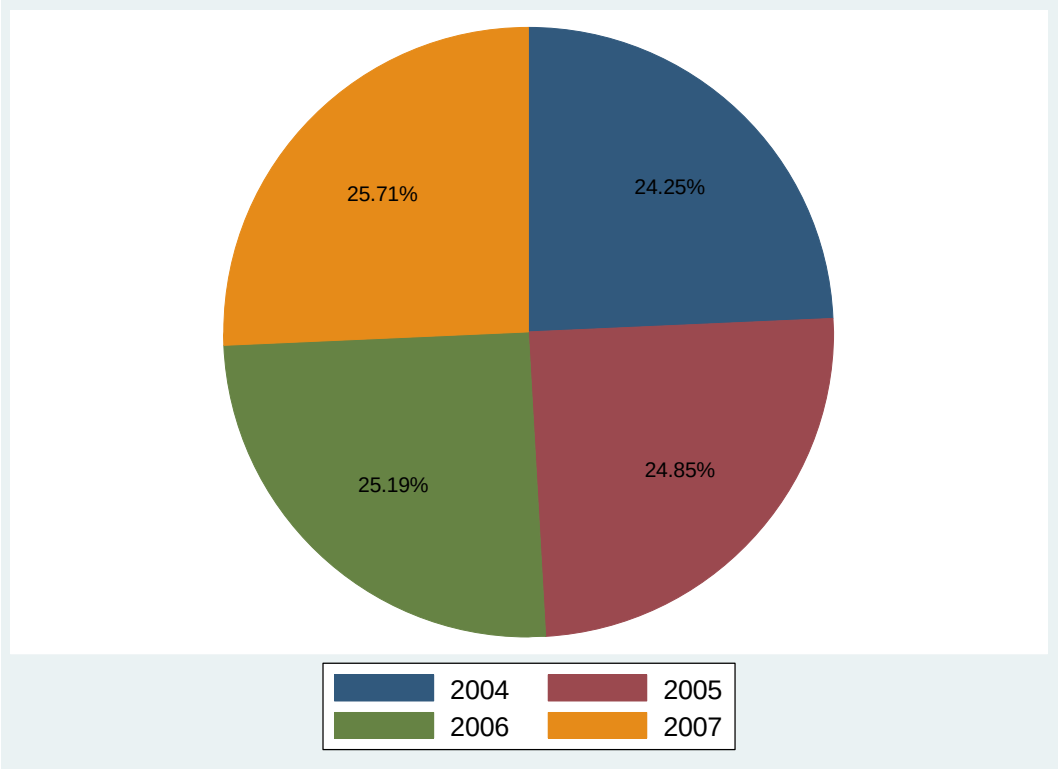


Figure 6.2 displays total corporate environmental disclosure quality distributed over the sample years, 2004-2007 inclusive. It shows the contribution made by each year towards the average quality of such disclosure. The figure also confirms the increasing trend in the quality of corporate environmental disclosure over the years, where 2004 has the smallest share, followed by 2005 and then 2006, with 2007 accounting for the greatest quality contribution towards total disclosure quality.

Figure 6.3

Distribution Of Total Environmental Disclosure Quality Over Categories

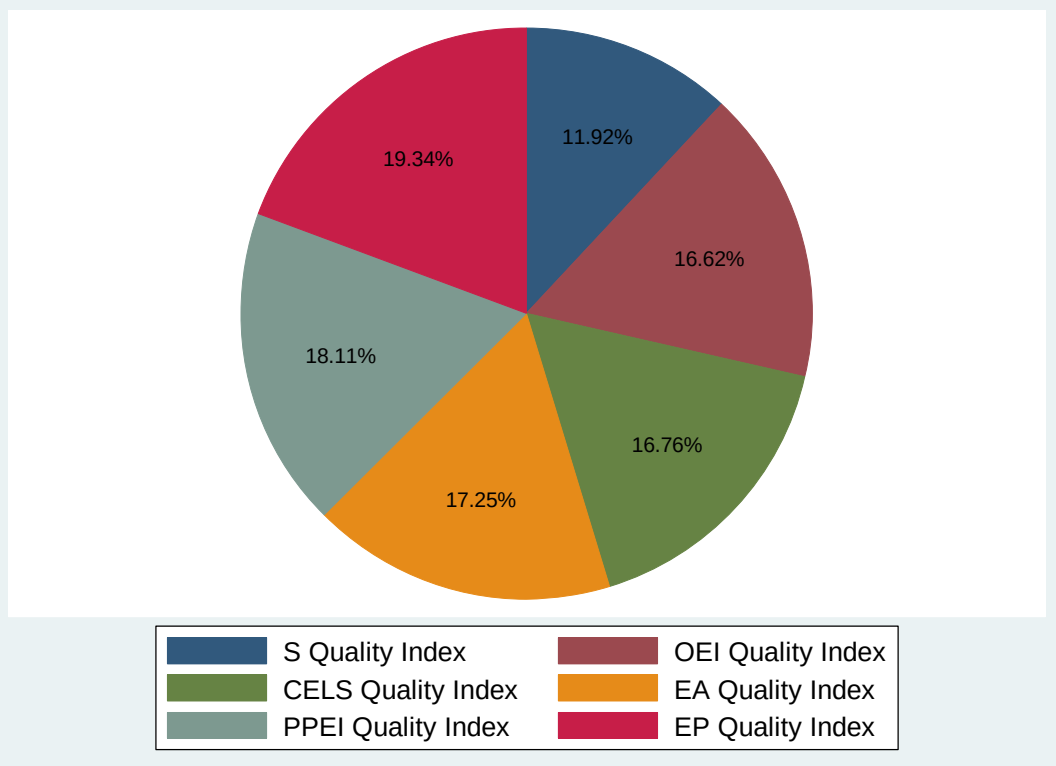


Figure 6.3 portrays total corporate environmental disclosure quality distributed over the different environmental disclosure categories. It shows the contribution made by each category towards the average quality of such disclosure. The pie chart indicates that the greatest quality component of corporate environmental disclosure is environmental policies disclosure, representing 19.34% of the total disclosure quality. The result reveals that companies are using this sort of disclosure as an effective tool in conveying an organization's philosophy, intentions, and objectives with respect to the environment and, hence, demonstrating environmental commitment and accountability to various stakeholders. On the other hand, sustainability disclosure represents the smallest quality component of corporate environmental disclosure with a share of 11.92% out of the total disclosure quality. This result can be attributed to the nature of this disclosure category, which includes broader environmental information on the maintenance of well being, that is technically difficult to assess.

6.3 EXAMINING THE RELATIONSHIP BETWEEN ENVIRONMENTAL DISCLOSURE QUALITY AND CORPORATE GOVERNANCE

This section is aimed at investigating the relationship between corporate governance mechanisms and the quality of corporate environmental disclosure practices in UK companies' annual reports. Corporate governance mechanisms are classified into the following three groups: (1) Board Characteristics: board independence, role duality, board size, board meetings, directors' qualifications and experience including educational background, community influence and cross-directorships; (2) Board Committees Characteristics: the presence of corporate environmental responsibility (CER) committee or responsible, audit committee independence, remuneration committee independence, nomination committee independence; and (3) Ownership Structure: ownership concentration, institutional ownership. In addition, the study controls for some corporate characteristics including company size, industry, profitability, leverage, liquidity, systematic risk, and cross-listing.

The section starts with some descriptive statistics of corporate governance mechanisms and corporate characteristics. Correlation analyses are then undertaken to detect any autocorrelations among variables. Different regression analyses are carried out to test the validity of the developed hypotheses in examining the relationship in question. Two models are tested in which the dependent variables are total corporate environmental disclosure quality and the quality of disclosure within each category. Finally, sensitivity analysis is carried out to check the robustness of the main regression analysis. Results are discussed and analyzed in terms of the theoretical framework adopted and conclusions are drawn from statistical findings.

6.3.1 Descriptive Statistics

Descriptive statistics are performed for each of corporate governance mechanisms and corporate characteristics. The results of the descriptive statistics are shown in the following tables.

Table 6.6

Descriptive Statistics Of Corporate Governance Mechanisms

Variable	Mean (Median)	Standard Deviation	Min. (Max.)	Standard Skewness	Standard Kurtosis
Board Independence	46.73 (50.00)	11.25	0.00 (100.00)	-0.10	3.82
Role Duality	0.04 (0.00)	0.19	0.00 (1.00)	4.82	24.21
Board Size	8.96 (8.00)	2.65	4.00 (21.00)	0.96	4.12
Board Meetings	8.91 (8.00)	3.04	3.00 (44.00)	2.72	24.67
Education	41.79 (40.00)	17.59	0.00 (100.00)	0.50	3.31
Community Influence	69.59 (71.43)	23.86	0.00 (100.00)	-0.60	2.53
Cross-directorships	66.88 (67.95)	21.53	0.00 (100.00)	-0.41	2.61
Corporate Environmental Responsibility (CER) Committee Presence	0.63 (1.00)	0.48	0.00 (1.00)	-0.56	1.31
Audit Committee Independence	96.19 (100.00)	12.49	0.00 (100.00)	-3.81	18.94
Remuneration Committee Independence	93.34 (100.00)	15.16	0.00 (100.00)	-2.97	14.18
Nomination Committee Independence	72.51 (71.43)	17.05	0.00 (100.00)	-0.24	3.52
Ownership Concentration	37.66 (34.79)	20.18	0.00 (98.61)	0.54	2.88
Institutional Ownership	32.59 (29.54)	18.98	0.00 (98.61)	0.78	3.33

Table 6.6 shows the descriptive statistics of the different corporate governance mechanisms examined in explaining the variability in the quality of corporate environmental disclosure practices. The mean board independence is 46.73%, indicating that approximately half of the directors are independent non-executive, which is in line with UK Corporate Governance Code (2010). The mean role duality is 0.04, reflecting compliance by the majority of the sample companies with the corporate governance principle of separating the CEO and chairman roles. However, the average board size is 8.96, being similar to that found in the Pensions and Investment Research Consultants (PIRC, 1998) survey of UK FTSE 350 companies of 9.80, revealing that large board size has been traditional practice in UK companies over time. The average board meetings is 8.91 per year, while the mean directors' qualifications and experience vary between 41.79% for education, 69.59% for community influence, and 66.88% for cross-directorships.

With respect to board committees, the mean presence of a CER committee on the board is 0.63, indicating that the majority of the sample companies support the formation of such committees, which in turn highlights the emphasis placed by UK companies on environmental issues. Moreover, the mean independence is 96.19%, 93.34%, and 72.51% for each of the audit, remuneration, and nomination committees respectively, revealing the relatively high degree of independence within board committees. Regarding ownership structure, it can be observed that the mean ownership concentration and mean institutional ownership are quite close (37.66 and 32.59 respectively), reflecting the fact that institutional ownership constitute the major and dominant form of blockholdings.

These results are considered to be reasonable following the issuance of the Combined Code (2003) of corporate governance in the UK. It may be worth mentioning that although the code is voluntary, in that it provides only guidelines of best practice of corporate governance, London Stock Exchange listing rules require companies to adhere to corporate governance principals. UK listed companies follow the Combined Code's (2003) rule of “comply or explain”, with small companies having an excuse for noncompliance if adherence is infeasible or impractical. This is particularly true given the wide variation in most corporate governance mechanisms, ranging from a minimum of 0 to a maximum of 100%. Such great variation can also be attributed to

the unfamiliarity by some companies with the adequate application of the principles of the newly issued code succeeding the period under investigation.

Regarding the standard skewness statistics, the presented data are not normally distributed. It is observed that the standard skewness of each of role duality, board meetings, audit committee independence and remuneration committee independence exceeds the range of ±1.96 evidencing that the normality of the data (see Haniffa and Hudaib, 2006). This result is confirmed by the standard kurtosis statistics, where the standard kurtosis for most of the corporate governance mechanisms exceed the normality range of ±3 (see Haniffa and Hudaib, 2006), indicating that such data are not normally distributed. As a consequence, a robust analysis is necessary for any hypotheses test related to the entire data.

Table 6.7

Descriptive Statistics Of Corporate Characteristics

Variable	Mean (Median)	Standard Deviation	Min. (Max.)	Standard Skewness	Standard Kurtosis
Size	5.91 (5.82)	0.74	4.30 (8.16)	0.44	2.82
Industry	0.36 (0.00)	0.48	0.00 (1.00)	0.59	1.35
Profitability	0.87 (0.91)	0.35	-2.00 (1.84)	-1.70	11.76
Leverage	1.17 (1.34)	0.58	-1.70 (2.12)	-2.05	7.99
Liquidity	1.54 (1.26)	1.94	0.00 (50.00)	17.75	430.14
Systematic Risk	1.00 (0.99)	0.35	0.02 (2.19)	0.24	3.03
Cross-Listing	0.11 (0.00)	0.31	0.00 (1.00)	2.51	7.28

Table 6.7 shows the descriptive statistics of the different corporate characteristics being controlled for. It can be observed that the sample companies are approximately divided equally between large and small companies (a mean of 5.91 between a minimum of 4.30 and a maximum of 8.16). However, the majority of the sample companies are operating in industries with lower environmental sensitivity (a mean of 0.36 between a minimum of 0.00 and a maximum of 1.00). There appears to be a wide variation between the maximum and minimum values among most of the company's attributes. This result is expected reflecting the impact of examining a wide range of companies with different size, varying degrees of environmental sensitivity, and various levels of profitability, leverage, liquidity, systematic risk, as well as different listing status. Liquidity has the greatest variation ranging from 0% to 50%. Therefore these variables are highly skewed, indicating the lack of normality in distribution. Particularly, leverage, liquidity and cross-listing exceeds the normality range of ±1.96. In addition, the standard kurtosis for almost all corporate characteristics, with the exception of size and industry, exceed the normality range of ±3 (see Haniffa and Hudaib, 2006), indicating that such data are not normally distributed. Accordingly, more attention is required in the analysis of such non-parametric data and interpretation of the results.

6.3.2 Correlation Analysis

Correlation analysis is carried out to detect any autocorrelation between corporate environmental disclosure quality and each of the different corporate governance mechanisms and corporate characteristics. Such bivariate analysis is undertaken using Pearson correlation and Spearman's Rank correlation. Both parametric and non parametric tests are used to examine the required relationships in order to allow for the non normality for some of the variables in question. In addition, correlation coefficients are also intended to attest the construct validity of the disclosure measurement and to check for multicollinearity. Pearson and Spearman's Rank correlation coefficients for the association between each of the total corporate environmental disclosure quality and the quality of disclosure within each category and all corporate governance and corporate characteristics included in the analysis are shown in the following tables.

Table 6.8
Pearson Correlations Of Environmental Disclosure Quality to Corporate Governance Mechanisms And Corporate Characteristics

	TED	EP	PPEI	CELS	EA	S	OEI	BI	RD	BS	BM	E	CI	CD	CERP	ACI	RCI	NCI	OC	IO	SZ	IND	PRO	LEV	LIQ	SR	CL
TED	1																										
EP	0.8881*	1																									
PPEI	0.8449*	0.6449*	1																								
CELS	0.6095*	0.4131*	0.3689*	1																							
EA	0.5106*	0.4394*	0.3415*	0.2628*	1																						
S	0.5205*	0.2884*	0.4295*	0.2773*	0.1568*	1																					
OEI	0.6026*	0.4165*	0.4126*	0.3282*	0.3650*	0.2508*	1																				
BI	0.1025*	0.1014*	0.1409*	0.0598	0.0263	0.0959*	0.1170*	1																			
RD	-0.0840*	-0.0779*	-0.1170*	-0.0053	-0.0476	-0.0677	-0.0207	0.0149	1																		
BS	0.1545*	0.1180*	0.1564*	0.0791*	0.0733*	0.0974*	0.1548*	0.1565*	-0.0679*	1																	
BM	0.0437	0.0552	0.0764*	0.0402	0.007	-0.061	0.0106	0.0175	0.0153	-0.1317*	1																
E	-0.0591	-0.0026	0.0068	-0.0607	0.0124	-0.007	-0.0406	0.1369*	-0.0852*	-0.2652*	0.0287	1															
CI	-0.02	-0.0282	-0.0072	-0.0429	0.0024	-0.0209	0.0133	0.1404*	-0.0006	-0.0345	0.0041	0.2218*	1														
CD	0.2144*	0.1656*	0.1735*	0.1375*	0.0376	0.2315*	0.1851*	0.4310*	-0.2145*	0.3368*	-0.0551	-0.0719*	0.0809*	1													
CERP	0.2243*	0.1573*	0.2303*	0.1736*	0.0711*	0.1093*	0.1097*	0.0964*	-0.0970*	0.1995*	-0.0732*	-0.0335	0.034	0.2309*	1												
ACI	0.0945*	0.1192*	0.0930*	0.0505	0.0281	-0.0133	0.0599	0.3994*	-0.0760*	-0.0297	-0.027	0.1595*	0.05	0.0604	0.0542	1											
RCI	0.0089	0.0315	-0.0194	0.0055	-0.017	-0.0649	0.0316	0.3264*	-0.0251	-0.064	0.0133	0.1557*	0.0719*	0.0229	-0.0002	0.7453*	1										
NCI	0.0358	0.0422	0.0497	-0.0036	-0.0785*	-0.0396	0.0044	0.3052*	-0.0266	-0.0635	0.0068	0.1506*	0.0436	0.039	0.0235	0.4150*	0.4345*	1									
OC	-0.1405*	-0.1294*	-0.1197*	-0.0422	-0.0384	-0.006	-0.1279*	-0.2789*	0.1235*	-0.2332*	0.0053	0.0189	-0.0188	-0.2311*	-0.1482*	-0.2627*	-0.2301*	0.0372	1								
IO	-0.0388	-0.0316	-0.0543	0.0028	0.0311	0.0134	-0.0928*	-0.1506*	-0.0504	-0.1128*	0.0069	0.0176	-0.0546	-0.0758*	-0.0877*	-0.2123*	-0.2041*	0.0297	0.8384*	1							
SZ	0.2614*	0.2319*	0.3002*	0.1017*	0.0872*	0.1530*	0.2510*	0.4072*	-0.1199*	0.6647*	-0.0519	-0.1386*	0.0207	0.4873*	0.2537*	0.1353*	0.0285	-0.009	-0.4584*	-0.3314*	1						
IND	0.1322*	0.1486*	0.0266	0.0663	0.0868*	-0.0306	0.0868*	0.0061	0.0174	0.0473	-0.1062*	-0.0403	-0.0052	0.036	0.0943*	0.0498	0.0813*	-0.0456	-0.1252*	-0.0696*	0.0401	1					
PRO	0.0393	0.0221	0.0624	0.0165	0.0427	-0.0359	-0.036	0.0193	-0.0324	0.0629	-0.0489	-0.0106	0.0809*	-0.0454	0.0978*	0.0288	0.0469	-0.0467	-0.052	-0.0750*	-0.001	0.0445	1				
LEV	0.1125*	0.1333*	0.1113*	0.0372	0.0132	0.0493	0.0707	0.0755*	-0.0713*	0.1806*	-0.0208	0.0166	-0.0175	0.1324*	0.0974*	0.0720*	0.0002	0.0141	-0.0964*	-0.0387	0.2922*	-0.0951*	-0.0845*	1			
LIQ	-0.0943*	-0.0957*	-0.0988*	-0.0705	-0.0222	-0.0532	-0.0902*	-0.0452	0.0272	-0.0605	-0.0572	0.033	-0.0142	-0.052	-0.0828*	0.0293	0.0476	-0.0053	-0.0229	-0.0372	-0.1502*	0.0800*	0.1021*	-0.3231*	1		
SR	0.1402*	0.1818*	0.1272*	0.1078*	0.0666	0.0505	0.0349	0.0251	-0.0263	0.0125	-0.0336	0.0613	-0.1509*	0.0633	0.056	0.0179	0.003	-0.0816*	-0.0284	0.063	0.0978*	0.2084*	-0.0373	0.0856*	-0.0483	1	
CL	-0.0203	-0.0284	0.0048	0.0888*	0.0898*	-0.002	0.0813*	0.0989*	-0.0698*	0.2982*	-0.0442	0.0234	0.0338	0.1678*	0.0114	0.0003	0.0038	0.0587	-0.0186	-0.0424	0.2363*	-0.057	-0.0043	0.049	-0.019	-0.0586	1

* Significance at confidence level of 95%. **TED** Total Environmental Disclosure, **EP** Environmental Policies, **PPEI** Product and Process-Related Environmental Issues, **CELS** Compliance with Environmental Laws and Standards, **EA** Environmental Auditing, **S** Sustainability, **OEI** Other Environmentally-Related Information, **BI** Board Independence, **RD** Role Duality, **BS** Board Size, **BM** Board Meetings, **E** Education, **CI** Community Influence, **CD** Cross-Directorships, **CERP** Corporate Environmental Responsibility (CER) Committee Presence, **ACI** Audit Committee Independence, **RCI** Remuneration Committee Independence, **NCI** Nomination Committee Independence, **OC** Ownership concentration, **IO** Institutional Ownership, **SZ** Size, **IND** Industry, **PRO** Profitability, **LEV** Leverage, **LIQ** Liquidity, **SR** Systematic Risk, **CL** Cross-Listing.

Table 6.9
Spearman Correlations Of Environmental Disclosure Quality to Corporate Governance Mechanisms And Corporate Characteristics

	TED	EP	PPEI	CELS	EA	S	OEI	BI	RD	BS	BM	E	CI	CD	CERP	ACI	RCI	NCI	OC	IO	SZ	IND	PRO	LEV	LIQ	SR	CL
TED	1																										
EP	0.8280*	1																									
PPEI	0.7497*	0.5052*	1																								
CELS	0.4899*	0.2589*	0.2475*	1																							
EA	0.3794*	0.3482*	0.2634*	0.1725*	1																						
S	0.4594*	0.2131*	0.3944*	0.2800*	0.1529*	1																					
OEI	0.5156*	0.3295*	0.2809*	0.2888*	0.2772*	0.2761*	1																				
BI	0.1986*	0.2438*	0.1568*	0.0458	0.0814	0.0876	0.0563	1																			
RD	-0.0719	-0.0053	-0.1187*	0.0122	-0.0286	-0.0869	0.0145	-0.0346	1																		
BS	0.1567*	0.1264*	0.1213*	0.1084*	0.0417	0.1071*	0.1980*	0.1721*	0.0071	1																	
BM	0.1750*	0.1724*	0.1130*	0.0785	-0.0101	-0.0267	0.0574	0.06	0.0177	-0.1004*	1																
E	0.077	0.098	0.0634	0.014	0.0169	0.0618	-0.0314	0.1754*	-0.0875	-0.2901*	0.1270*	1															
CI	-0.0722	-0.0296	-0.0756	-0.1102*	-0.0073	-0.0684	0.0476	0.2161*	-0.0487	-0.0085	-0.0918	0.2555*	1														
CD	0.1752*	0.1561*	0.0741	0.1286*	-0.0172	0.1910*	0.1213*	0.4356*	-0.1203*	0.2942*	-0.1070*	0.0626	0.2639*	1													
CERP	0.1194*	0.0824	0.1043*	0.0833	0.0193	0.1137*	-0.0146	0.0925	-0.0234	0.0675	0.0435	0.2117*	0.1082*	0.1786*	1												
ACI	0.1014*	0.1684*	0.0556	-0.0843	0.0768	-0.0651	0.0085	0.2151*	0.0215	-0.1379*	0.0929	0.0531	-0.0072	-0.0589	0.0013	1											
RCI	-0.0262	-0.0031	-0.0773	-0.0449	-0.0383	-0.0691	0.0286	0.1212*	0.0463	-0.0226	0.0478	0.0695	0.0783	0.0057	-0.0361	0.3488*	1										
NCI	0.1240*	0.1524*	0.0943	0.0239	-0.0185	-0.0155	-0.0148	0.2209*	0.0492	0.0154	0.034	0.1292*	0.045	-0.0038	0.044	0.1966*	0.2712*	1									
OC	-0.1155*	-0.1383*	-0.0144	-0.0378	0.0027	0.0321	-0.1520*	-0.2066*	0.0913	-0.1947*	-0.1619*	-0.012	-0.1149*	-0.1561*	-0.059	-0.1125*	-0.1475*	0.0684	1								
IO	-0.0476	-0.0687	0.0282	0.0201	0.0415	0.0485	-0.1456*	-0.1005*	0.0377	-0.1292*	-0.1433*	-0.0052	-0.0831	-0.0744	-0.0485	-0.0984	-0.1619*	0.035	0.8841*	1							
SZ	0.2318*	0.2399*	0.1809*	0.0634	0.0429	0.096	0.1961*	0.3681*	-0.0962	0.6650*	-0.0389	-0.1170*	0.1422*	0.4518*	0.1255*	-0.0458	-0.0235	-0.0251	-0.3782*	-0.2934*	1						
IND	-0.0117	-0.0222	-0.0767	-0.0095	0.075	-0.0316	0.0566	-0.0925	-0.0149	0.0556	-0.1357*	-0.0952	-0.0424	0.0021	0.0158	0.0074	0.034	-0.1004*	-0.1134*	-0.0838	-0.0054	1					
PRO	0.0378	0.0614	0.0467	-0.0542	0.1360*	-0.0575	0.0156	0.1441*	-0.1180*	0.0986	-0.0155	-0.0197	0.0017	0.0269	0.0235	0.1144*	0.0785	-0.1643*	-0.1176*	-0.0679	0.0713	0.1025*	1				
LEV	0.0525	0.1438*	-0.0197	0.0396	-0.0496	0.0523	0.0341	0.0296	0.0697	0.0874	-0.0244	0.0857	-0.0023	0.1131*	0.0745	-0.0475	-0.0928	-0.0084	-0.0203	-0.0025	0.1946*	-0.1542*	-0.1848*	1			
LIQ	-0.0722	-0.057	-0.0915	-0.076	0.0482	-0.1124*	-0.0601	-0.1054*	-0.1030*	-0.1691*	-0.1043*	-0.0759	-0.0939	-0.0834	-0.1646*	0.0431	0.0548	-0.1668*	-0.0032	0.0581	-0.2615*	0.2988*	0.2236*	-0.2861*	1		
SR	0.1067*	0.0807	0.1457*	0.0823	0.0411	0.0156	-0.0161	-0.0953	-0.0413	-0.0663	0.1057*	0.1021*	-0.1407*	-0.1249*	0.0409	0.0082	0.0401	0.0035	0.0422	0.0857	-0.0704	0.2065*	-0.0306	-0.0358	0.1219*	1	
CL	0.0915	0.098	0.052	0.1138*	0.1438*	0.0064	0.077	0.1395*	-0.0337	0.3582*	-0.0793	-0.0481	0.0294	0.2674*	0.0391	-0.0705	0.0526	0.0942	-0.0366	-0.0525	0.3864*	0.0646	0.0291	-0.0325	-0.2154*	-0.0451	1

* Significance at confidence level of 95%. **TED** Total Environmental Disclosure, **EP** Environmental Policies, **PPEI** Product and Process-Related Environmental Issues, **CELS** Compliance with Environmental Laws and Standards, **EA** Environmental Auditing, **S** Sustainability, **OEI** Other Environmentally-Related Information, **BI** Board Independence, **RD** Role Duality, **BS** Board Size, **BM** Board Meetings, **E** Education, **CI** Community Influence, **CD** Cross-Directorships, **CERP** Corporate Environmental Responsibility (CER) Committee Presence, **ACI** Audit Committee Independence, **RCI** Remuneration Committee Independence, **NCI** Nomination Committee Independence, **OC** Ownership concentration, **IO** Institutional Ownership, **SZ** Size, **IND** Industry, **PRO** Profitability, **LEV** Leverage, **LIQ** Liquidity, **SR** Systematic Risk, **CL** Cross-Listing.

Table 6.8 presents a Pearson correlation matrix for the variables included in the analysis. Pearson correlation coefficients show association of each of the total corporate environmental disclosure quality and the quality of disclosure within each category to all corporate governance and corporate characteristics included in the analysis. The significant association is identified at confidence level of 95%. Results indicate that at this level of environmental disclosure quality there is a significant association between total environmental disclosure quality and most corporate governance characteristics, including board independence, role duality, board size, cross-directorships, corporate environmental responsibility (CER) committee presence, audit committee independence and ownership concentration. Referred to the correlation coefficients, there is a positive relationship between total environmental disclosure quality and each of board independence, board size, cross-directorships, corporate environmental responsibility (CER) committee presence and audit committee independence, while there is a negative relationship between total environmental disclosure quality and each of role duality and ownership concentration. Most of these results are in agreement with research hypotheses regarding the association between total environmental disclosure quality and the different corporate governance mechanisms.

Regarding the different categories of environmental disclosure, there is a significant positive relationship between board independence and disclosure quality of each of environmental policies, product and process-related environmental issues, sustainability and other environmentally-related information. There is a consistently significant negative relationship between role duality and disclosure quality of each of environmental policies and product and process-related environmental issues. Board size is significantly and positively associated with disclosure quality of each of the disclosure categories. Board meetings are associated with only product and process-related environmental issues quality. However, cross-directorships have a persistent significant and positive relationship to disclosure quality of almost all of the disclosure categories. Similarly, corporate environmental responsibility (CER) committee presence is significantly and positively associated with disclosure quality of each of environmental disclosure categories. Audit committee independence is significantly and positively associated with disclosure quality of each of environmental policies and product and process-related environmental issues, while

nomination committee independence is significantly and negatively associated with only environmental auditing disclosure quality. Finally, as to the ownership structure, ownership concentration is significantly and negatively associated with disclosure quality of each of environmental policies, product and process-related environmental issues and other environmentally-related information, while institutional ownership is significantly and negatively associated with only other environmentally-related information quality.

Results also reveal a significant positive relationship between total environmental disclosure quality and corporate characteristics including company size, industry, leverage and systematic risk, while a significant negative relationship between total environmental disclosure quality and liquidity. No significant relationship is detected between total environmental disclosure quality and each of profitability and cross-listing. With respect to environmental disclosure categories, the results confirmed the significant positive association of company size with disclosure quality of all disclosure categories. However, for the other corporate characteristics including industry, leverage, liquidity, systematic risk and cross-listing, the results are partially supported for some of the disclosure categories. Nevertheless, the insignificant relationship of profitability to disclosure quality is consistently confirmed for all environmental disclosure categories.

Table 6.9 presents a Spearman correlation matrix for the variables included in the analysis. Spearman's rank correlation coefficients show association of each of the total corporate environmental disclosure quality and the quality of disclosure within each category to all corporate governance and corporate characteristics included in the analysis. The significant association is identified at confidence level of 95%. Results for total corporate environmental disclosure quality strongly support the findings of the Pearson test regarding all corporate governance variables, except for role duality, board meetings and nomination committee independence, where the former one was no longer significant while the latter two were found to be significantly and positively associated with total disclosure quality. Moreover, concerning the different categories of environmental disclosure, Spearman coefficients show consistent results with Pearson correlations of almost all corporate governance variables, including board independence, role duality, board size, board meetings, cross-directorships, corporate

environmental responsibility (CER) committee presence, audit committee independence, ownership concentration and institutional ownership, to disclosure quality of some of the disclosure categories, with that of other categories diminishing in significance. However, community influential directors was found to be associated with disclosure quality of compliance with environmental laws and standards, while nomination committee independence is correlated to environmental policies disclosure quality but not to that of environmental auditing. Most of these results are in agreement with research hypotheses regarding the association between environmental disclosure quality and the different corporate governance mechanisms.

Spearman coefficients also support the results of the Pearson test regarding the significant positive relationship between total environmental disclosure quality and each of company size and systematic risk, and insignificant relationship with each of profitability and cross-listing. However, unlike Pearson coefficients, industry, leverage and liquidity appeared to have insignificant association with total disclosure quality. With respect to environmental disclosure categories, the results confirmed the significant positive association of company size with disclosure quality of most disclosure categories as well as the insignificant association of industry with total disclosure quality. However, for the other corporate characteristics including profitability, leverage, liquidity, systematic risk and cross-listing, the results are partially supported for some of the disclosure categories.

6.3.2.1 Construct Validity

Construct validity of the disclosure measurement focuses on consistency with theoretical expectations and evidence from literature. Correlation analysis is suggested as a means by which construct validity can be established (Sekaran, 2003). Correlation coefficients have been used in prior disclosure studies to assess the validity of disclosure scores (see Ahmed and Courtis, 1999; Botosan, 1997; Cheng and Courtenay, 2006). Using correlation analysis, two tests are performed to check the construct validity of the disclosure indices. Primarily, correlation between the disclosure index and its component indices has been employed. In addition, correlation between disclosure indices and significant explanatory variables identified

in prior studies has been used to validate the disclosure index (see Ahmed and Courtis, 1999; Botosan, 1997).

Following these studies, correlation analysis of the total environmental disclosure quality index and its component indices of environmental disclosure categories was conducted. The results of Pearson correlation and Spearman's rank correlation are shown in Table 6.8 and Table 6.9 respectively. Both Pearson and Spearman correlation coefficients show that the disclosure quality indices of all environmental disclosure categories are highly correlated to the total environmental disclosure quality index. This indicates how well the classification or grouping scheme interprets the total score. Moreover, it is expected that a company's disclosure strategies are similar as to the different categories of disclosure (Botosan, 1997; Cheng and Courtenay, 2006). In this respect, the results also reveal that the quality indices of the different environmental disclosure categories are correlated to each other.

In addition, two corporate characteristics documented by prior disclosure studies to be key determinants in explaining the variation in disclosure practices are company size and industry. Therefore, the correlation between the quality indices of each of total environmental disclosure and its categories and each of company size and industry is investigated. Pearson correlation coefficients indicate that total environmental disclosure quality index is correlated to each of the two corporate characteristics. Results also show that disclosure quality indices of almost all environmental disclosure categories are correlated to each of company size and industry (see Table 6.8). Spearman correlation coefficients confirmed such results as to company size (see Table 6.9). Taken together the results confirm that disclosure quality indices have a considerable degree of validity in that they consistently capture the quality of environmental disclosure practices in the annual reports.

6.3.2.2 Multicollinearity Check

Multicollinearity implies the existence of a linear relationship between two or more explanatory variables. Multicollinearity makes it difficult to differentiate the individual effects of the explanatory variables and regression estimators may be

biased in that they tend to have large variances (Murray, 2006). Furthermore, if there is a perfect linear relationship among the explanatory variables, the estimates for a regression model cannot be uniquely computed. The possible existence of multicollinearity is tested based on the correlation matrix incorporating all the independent and control variables. Both Pearson and Spearman's rank correlation matrices show that correlation coefficients are less than 0.8, the limit or cut off correlation percentage commonly suggested by prior studies after which multicollinearity is likely to exist (see Gujarati, 2003). These results suggest that there is no need to be concerned about the correlation of either the independent variables to each other, the control variables to each other, or the independent variables to the control variables.

An exception is the coefficient of correlation between the two independent variables representing ownership structure. Specifically, there is a slight multicollinearity between ownership concentration and institutional ownership, where Pearson and Spearman correlation coefficients are 0.8384 and 0.8841 respectively (see Table 6.8 and Table 6.9). This result is expected given that institutional ownership constitute the major and dominant form of blockholdings. However, as such multicollinearity is only slightly in excess of the optimal limit, results indicate that multicollinearity is unlikely to be a potential problem. Nevertheless, the statistical effect of including both ownership concentration and institutional ownership in the same regression model will be further examined.

The possible existence of multicollinearity is further tested through computing the variance inflation factor (VIF). According to Gujarati (2003), there is no problem if the VIF is less than 10 and the tolerance coefficient is greater than 0.10. Table 6.10 presents the variance inflation factor (VIF) and tolerance coefficients of each of the explanatory variable. The table shows that the highest VIF is 5.21 and the mean VIF is 1.91. Moreover, the lowest tolerance coefficient is 0.192. Therefore, the results of VIF and tolerance coefficients indicate that there is no unacceptable level of multicollinearity among the current study's variables, confirming that there is no need to be concerned about the correlation between the explanatory variables.

Table 6.10

Variance Inflation Factor (VIF) Of Corporate Governance Mechanisms And Corporate Characteristics

Variable	VIF	Tolerance 1/VIF
Ownership Concentration	5.21	0.192
Institutional Ownership	4.57	0.219
Size	2.99	0.335
Audit Committee Independence	2.72	0.368
Remuneration Committee Independence	2.58	0.388
Board Size	2.23	0.448
Board Independence	1.94	0.517
Cross-directorships	1.63	0.614
Nomination Committee Independence	1.47	0.682
Liquidity	1.28	0.783
Leverage	1.25	0.802
Education	1.24	0.808
Cross-Listing	1.22	0.823
Role Duality	1.20	0.836
Industry	1.18	0.847
Systematic Risk	1.13	0.883
Corporate Environmental Responsibility (CER) Committee Presence	1.13	0.886
Community Influence	1.13	0.887
Profitability	1.09	0.916
Board Meetings	1.08	0.927
Mean VIF	1.91	

6.3.3 Regression Analysis

Multiple regression analysis using Ordinary Least Squares (OLS) longitudinal panel regression with robust standard error is employed to test the developed research hypotheses. Such multivariate analysis is undertaken to examine the relationship between corporate environmental disclosure quality and each of the different corporate governance mechanisms after controlling for corporate characteristics. Two models are tested in which the dependent variables are total corporate environmental disclosure quality and the quality of disclosure within each disclosure category.

In addition, Generalized Least Squares (GLS) regression is performed to further test the research hypotheses and to attest the reliability of the main OLS regression results. GLS takes into consideration that the variances of the observations might be unequal and/or there might be a certain degree of correlation between the observations. Finally, sensitivity analysis using pooled cross-sectional Ordinary Least Squares (OLS) regression with robust standard error is carried out to check the sensitivity and, hence, the robustness of the main regression analysis. Results are discussed and analyzed in terms of the theoretical framework adopted and conclusions are drawn from statistical findings.

6.3.3.1 OLS Regression Analysis

Ordinary Least Squares (OLS) longitudinal panel regression with robust standard error is employed to test the developed research hypotheses. The advantage of panel data regression is that it takes the time effect into account. The robust standard error option is applied in order to adjust the OLS parametric test to fit with non-parametric data, as shown by the descriptive statistics indicating that the study's data are not normally distributed. The results of the Ordinary Least Squares (OLS) regression of corporate governance on environmental disclosure quality are shown in Table 6.11.

Table 6.11
OLS Longitudinal Panel Regression With Robust Standard Error Of Corporate Governance On Environmental Disclosure Quality

	TED		EP		PPEI		CELS		EA		S		OEI	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Intercept	60.13***	0.000	54.60***	0.000	55.14***	0.001	72.77***	0.000	71.23***	0.000	67.87***	0.003	61.99***	0.000
BI	-0.02	0.388	-0.03**	0.045	0.01	0.811	0.01	0.479	0.01	0.784	-0.01	0.740	-0.01	0.397
RD	-1.90*	0.069	-1.52*	0.076	-5.35**	0.028	2.19	0.156	-1.25	0.432	-5.98**	0.025	0.55	0.873
BS	-0.03	0.836	0.01	0.964	-0.10	0.428	-0.06	0.716	0.04	0.373	0.05	0.859	-0.06	0.676
BM	0.20**	0.033	0.28***	0.007	0.23**	0.023	0.04	0.661	-0.01	0.766	0.00	0.998	0.02	0.457
E	0.01	0.566	0.02	0.171	0.01	0.619	-0.01	0.526	0.01	0.605	0.01	0.490	0.00	0.799
CI	-0.01	0.128	-0.01	0.161	-0.03**	0.016	-0.01	0.541	0.00	0.864	-0.03	0.200	-0.01	0.217
CD	0.02	0.110	0.02	0.286	0.00	0.869	0.03*	0.051	-0.01	0.610	0.08**	0.026	0.03*	0.059
CERP	1.10	0.191	0.46	0.585	2.26***	0.005	1.90	0.191	0.25	0.599	0.84	0.142	0.25	0.466
ACI	0.04	0.162	0.06*	0.072	0.04	0.292	0.05*	0.070	0.02	0.381	-0.01	0.920	0.02*	0.068
RCI	-0.02	0.202	-0.02	0.219	-0.05**	0.017	-0.02	0.462	0.00	0.787	0.00	0.915	0.01	0.749
NCI	0.00	0.951	0.00	0.963	0.02	0.175	-0.01	0.841	-0.04**	0.031	-0.02	0.550	-0.01	0.594
OC	0.00	0.806	-0.01	0.742	-0.01	0.675	-0.02**	0.021	-0.03	0.195	0.04	0.179	0.03	0.111
IO	0.01	0.772	0.01	0.764	0.02	0.560	0.03**	0.035	0.04	0.115	-0.03	0.133	-0.04**	0.024
SZ	1.34*	0.099	1.60*	0.051	2.53*	0.093	-0.74	0.153	0.04	0.908	0.63	0.544	1.85**	0.037
IND	1.33**	0.011	1.79**	0.020	0.11	0.810	1.09**	0.049	0.72	0.151	-0.46	0.362	1.68***	0.002
PRO	0.33	0.592	0.30	0.734	1.11	0.230	0.88	0.270	0.16	0.668	-1.44	0.215	-0.37	0.679
LEV	0.05	0.887	0.48	0.381	-0.01	0.981	-0.37	0.635	-0.05	0.845	-0.17	0.784	0.03	0.956
LIQ	-0.64**	0.021	-0.47*	0.052	-0.68**	0.039	-1.51***	0.000	-0.23	0.431	-0.29	0.578	-1.08	0.111
SR	0.83	0.297	1.44	0.234	1.19	0.137	1.64	0.182	-0.08	0.906	0.81	0.529	-0.18	0.880
CL	-0.08	0.896	-0.14	0.832	-0.91	0.302	1.72**	0.019	1.43*	0.056	-1.88	0.237	-0.36	0.462
Adjusted R^2 (%)	15.90		14.22		17.94		9.41		4.61		9.59		11.02	

***$p \leq 0.01$, **$p \leq 0.05$, and *$p \leq 0.10$.

TED Total Environmental Disclosure, **EP** Environmental Policies, **PPEI** Product and Process-Related Environmental Issues, **CELS** Compliance with Environmental Laws and Standards, **EA** Environmental Auditing, **S** Sustainability, **OEI** Other Environmentally-Related Information, **BI** Board Independence, **RD** Role Duality, **BS** Board Size, **BM** Board Meetings, **E** Education, **CI** Community Influence, **CD** Cross-Directorships, **CERP** Corporate Environmental Responsibility (CER) Committee Presence, **ACI** Audit Committee Independence, **RCI** Remuneration Committee Independence, **NCI** Nomination Committee Independence, **OC** Ownership concentration, **IO** Institutional Ownership, **SZ** Size, **IND** Industry, **PRO** Profitability, **LEV** Leverage, **LIQ** Liquidity, **SR** Systematic Risk, **CL** Cross-Listing.

Table 6.11 presents the results of Ordinary Least Squares (OLS) longitudinal panel regression with robust standard error of corporate governance on environmental disclosure quality. Results show a significant positive association between total environmental disclosure quality and board meetings ($p \leq 0.05$), while a significant negative association of total environmental disclosure quality with role duality ($p \leq 0.10$). However, no significant association is found between total environmental disclosure quality and each of board independence, board size, directors' education, community influence, cross-directorships, corporate environmental responsibility (CER) committee presence, audit committee independence, remuneration committee independence, nomination committee independence, ownership concentration and institutional ownership. Nevertheless, the positive relationship of total environmental disclosure quality to each of directors' education, cross-directorships, corporate environmental responsibility (CER) committee presence, audit committee independence, nomination committee independence and institutional ownership are in the expected direction. Contrary to expectation, however, a negative relationship of total environmental disclosure quality to each of board independence, board size, community influence and remuneration committee independence is documented, while a positive relationship to ownership concentration is found. The adjusted R Squared of the model is 15.90% indicating that 15.90% of the changes in total environmental disclosure quality is explained by the changes in its examined determinants.

Regarding the different categories of environmental disclosure, there is a significant negative relationship between board independence and environmental policies disclosure quality ($p \leq 0.05$). Similarly, there is a significant negative relationship between role duality and disclosure quality of each of environmental policies ($p \leq 0.10$), product and process-related environmental issues ($p \leq 0.05$) and sustainability ($p \leq 0.05$). However, board size has insignificant association with the disclosure quality of all of the disclosure categories. There is also a strong significant positive relationship between board meetings and disclosure quality of each of environmental policies ($p \leq 0.01$) and product and process-related environmental issues ($p \leq 0.05$).

With respect to directors' qualifications and experience, although education is associated with the disclosure quality of none of the disclosure categories, community

influence has significant negative association with only product and process-related environmental issues disclosure quality ($p \leq 0.05$), while cross-directorships has a significant positive relationship to the disclosure quality of each of compliance with environmental laws and standards ($p \leq 0.10$), sustainability ($p \leq 0.05$) and other environmentally-related information ($p \leq 0.10$).

Referring to board committees, corporate environmental responsibility (CER) committee presence has a strong significant positive relationship to product and process-related environmental issues disclosure quality ($p \leq 0.01$). There is only marginally significant positive relationship between audit committee independence and disclosure quality of each of environmental policies ($p \leq 0.10$), compliance with environmental laws and standards ($p \leq 0.10$) and other environmentally-related information ($p \leq 0.10$). However, a significant negative relationship is detected between remuneration committee independence and product and process-related environmental issues disclosure quality ($p \leq 0.05$) as well as between nomination committee independence and environmental auditing disclosure quality ($p \leq 0.05$).

As for ownership structure, it can be observed that ownership concentration is significantly and negatively associated with only compliance with environmental laws and standards disclosure quality ($p \leq 0.05$). However, institutional ownership is found to be significantly and positively associated with compliance with environmental laws and standards disclosure quality ($p \leq 0.05$), but significantly and negatively associated with other environmentally-related information disclosure quality ($p \leq 0.05$).

Results also reveal a significant positive relationship between total environmental disclosure quality and corporate characteristics including company size ($p \leq 0.10$) and industry ($p \leq 0.05$), while a significant negative relationship to liquidity ($p \leq 0.05$). No significant relationship is found between total environmental disclosure quality and each of profitability, leverage, systematic risk and cross-listing. Concerning environmental disclosure categories, the results confirmed the significant positive association of each of company size and industry, as well as the significant negative association of liquidity, with the disclosure quality of some disclosure categories. Similarly, the insignificant relationship of the other corporate characteristics, including profitability, leverage and systematic risk, to disclosure quality is consistently confirmed for all environmental disclosure categories. However, for

cross-listing, the results partially supported the insignificant relationship for most of the disclosure categories, but not for others where a significant positive association is detected.

6.3.3.2 GLS Regression Analysis

Generalized Least Squares (GLS) longitudinal panel regression with robust standard error is carried out to further test the research hypotheses and to attest the reliability of the main OLS regression results. GLS is a technique for estimating the unknown parameters in a linear regression model. GLS is applied when the variances of the observations are unequal or when there is a certain degree of correlation between the observations. Unequal variances may exist due to the presence of outliers and skewness. In this regard, it is preferable to give less weight for observations arising from populations with greater variability than the weight given for observations from populations with smaller variability. However, OLS does not make use of the information pertaining to the unequal variability of the dependent variable as it assigns equal weight to each observation (See Gujarati, 2003).

The advantage of panel data regression is that it takes the time effect into account. The robust standard error option is applied in order to adjust the GLS parametric test to fit with non-parametric data, as shown by the descriptive statistics indicating that the study's data are not normally distributed. The results of the Generalized Least Squares (GLS) regression of corporate governance on environmental disclosure quality are shown in Table 6.12.

Table 6.12
GLS Longitudinal Panel Regression With Robust Standard Error Of Corporate Governance On Environmental Disclosure Quality

	TED		EP		PPEI		CELS		EA		S		OEI	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Intercept	58.52***	0.000	52.68***	0.000	52.44***	0.000	74.15***	0.000	69.40***	0.000	65.94***	0.000	61.29***	0.000
BI	-0.02	0.408	-0.03**	0.016	0.01	0.708	0.01	0.516	0.01	0.649	0.00	0.994	-0.01	0.401
RD	-1.84***	0.001	-1.39***	0.003	-5.04***	0.000	2.11*	0.099	-0.94	0.417	-6.04***	0.000	0.64	0.835
BS	-0.06	0.638	-0.03	0.826	-0.16	0.143	-0.04	0.820	0.00	0.971	0.03	0.907	-0.07	0.580
BM	0.21***	0.000	0.28***	0.000	0.24***	0.000	0.04	0.659	-0.01	0.764	0.00	0.986	0.02	0.292
E	0.01	0.477	0.03*	0.055	0.01	0.531	-0.01	0.448	0.01	0.507	0.01	0.464	0.00	0.822
CI	-0.01**	0.035	-0.01*	0.058	-0.03***	0.000	-0.01	0.498	0.00	0.928	-0.03	0.114	-0.01	0.120
CD	0.02**	0.026	0.02	0.214	0.00	0.955	0.04***	0.002	-0.01	0.448	0.08***	0.000	0.03***	0.004
CERP	1.14*	0.082	0.50	0.510	2.31***	0.000	1.86	0.101	0.30	0.507	0.87**	0.031	0.26	0.383
ACI	0.05**	0.026	0.08***	0.002	0.05*	0.089	0.04**	0.044	0.04*	0.097	0.01	0.821	0.02***	0.000
RCI	-0.03*	0.071	-0.04*	0.070	-0.07***	0.000	-0.01	0.694	-0.02	0.344	-0.01	0.686	0.00	0.909
NCI	0.00	0.865	0.00	0.956	0.02*	0.054	-0.01	0.780	-0.03***	0.000	-0.02	0.572	-0.01	0.583
OC	0.00	0.842	0.00	0.771	-0.01	0.661	-0.02***	0.000	-0.03*	0.070	0.04*	0.059	0.03**	0.018
IO	0.01	0.605	0.01	0.607	0.02	0.430	0.03***	0.001	0.05**	0.012	-0.02**	0.040	-0.04***	0.000
SZ	1.48***	0.009	1.76***	0.000	2.76***	0.008	-0.84**	0.041	0.21	0.552	0.69	0.438	1.89***	0.000
IND	1.32***	0.000	1.77***	0.000	0.11	0.800	1.12***	0.002	0.70**	0.044	-0.46	0.305	1.68***	0.000
PRO	0.62	0.277	0.67	0.421	1.59**	0.025	0.57	0.386	0.56	0.147	-1.06	0.192	-0.25	0.739
LEV	0.05	0.882	0.45	0.315	0.00	0.994	-0.36	0.613	-0.10	0.634	-0.21	0.714	0.04	0.939
LIQ	-0.64***	0.000	-0.47***	0.002	-0.69***	0.001	-1.49***	0.000	-0.26	0.295	-0.35	0.451	-1.08**	0.025
SR	1.01*	0.083	1.67**	0.047	1.51**	0.024	1.45	0.146	0.17	0.770	1.01	0.383	-0.13	0.908
CL	-0.01	0.984	-0.05***	0.009	-0.86	0.202	1.67***	0.000	1.46***	0.003	-1.90	0.138	-0.35	0.398
Adjusted R^2 (%)	16.05		14.37		18.10		9.48		4.90		9.70		11.04	

***$p \leq 0.01$, **$p \leq 0.05$, and *$p \leq 0.10$.

TED Total Environmental Disclosure, **EP** Environmental Policies, **PPEI** Product and Process-Related Environmental Issues, **CELS** Compliance with Environmental Laws and Standards, **EA** Environmental Auditing, **S** Sustainability, **OEI** Other Environmentally-Related Information, **BI** Board Independence, **RD** Role Duality, **BS** Board Size, **BM** Board Meetings, **E** Education, **CI** Community Influence, **CD** Cross-Directorships, **CERP** Corporate Environmental Responsibility (CER) Committee Presence, **ACI** Audit Committee Independence, **RCI** Remuneration Committee Independence, **NCI** Nomination Committee Independence, **OC** Ownership concentration, **IO** Institutional Ownership, **SZ** Size, **IND** Industry, **PRO** Profitability, **LEV** Leverage, **LIQ** Liquidity, **SR** Systematic Risk, **CL** Cross-Listing.

Table 6.12 presents the results of Generalized Least Squares (GLS) longitudinal panel regression with robust standard error of corporate governance on environmental disclosure quality. Results show a significant positive association between total environmental disclosure quality and each of board meetings ($p \leq 0.01$), cross-directorships ($p \leq 0.05$), corporate environmental responsibility (CER) committee presence ($p \leq 0.10$) and audit committee independence ($p \leq 0.05$). Results also indicate a significant negative association of total environmental disclosure quality with each of role duality ($p \leq 0.01$) and community influence ($p \leq 0.05$) and relatively less significant negative association with remuneration committee independence ($p \leq 0.10$). However, no significant association is found between total environmental disclosure quality and each of board independence, board size, directors' education, nomination committee independence, ownership concentration and institutional ownership. Nevertheless, the positive relationship of total environmental disclosure quality to each of directors' education, nomination committee independence and institutional ownership are in the expected direction. Contrary to expectation, however, a negative relationship of total environmental disclosure quality to each of board independence and board size is documented, while a positive relationship to ownership concentration is found. The adjusted R Squared of the model is 16.05% indicating that 16.05% of the changes in total environmental disclosure quality is explained by the changes in its examined determinants.

Regarding the different categories of environmental disclosure, there is a significant negative relationship between board independence and environmental policies disclosure quality ($p \leq 0.05$). Similarly, there is a strong significant negative relationship between role duality and disclosure quality of each of environmental policies ($p \leq 0.01$), product and process-related environmental issues ($p \leq 0.01$) and sustainability ($p \leq 0.01$). However, board size has insignificant association with the disclosure quality of all of the disclosure categories. There is also a strong significant positive relationship between board meetings and disclosure quality of each of environmental policies ($p \leq 0.01$) and product and process-related environmental issues ($p \leq 0.01$).

With respect to directors' qualifications and experience, although education has only marginally significant positive association with environmental policies ($p \leq 0.10$)

disclosure quality, community influence is significantly and negatively associated with the disclosure quality of each of environmental policies ($p \leq 0.10$) and product and process-related environmental issues ($p \leq 0.01$), while cross-directorships has a persistent strong significant and positive relationship to the disclosure quality of each of compliance with environmental laws and standards ($p \leq 0.01$), sustainability ($p \leq 0.01$) and other environmentally-related information ($p \leq 0.01$).

Referring to board committees, corporate environmental responsibility (CER) committee presence has a strong significant positive relationship to product and process- related environmental issues disclosure quality ($p \leq 0.01$), with diminishing impact on sustainability disclosure quality ($p \leq 0.05$). There is also a significant positive relationship between audit committee independence and the disclosure quality of almost all disclosure categories including environmental policies ($p \leq 0.01$), product and process-related environmental issues ($p \leq 0.10$), compliance with environmental laws and standards ($p \leq 0.05$), environmental auditing ($p \leq 0.10$) and other environmentally-related information ($p \leq 0.01$). However, a significant negative association is detected between remuneration committee independence and the disclosure quality of each of environmental policies ($p \leq 0.10$) and product and process- related environmental issues ($p \leq 0.01$). Similarly, a significant negative relationship is found between nomination committee independence and environmental auditing disclosure quality ($p \leq 0.01$), although a marginally significant positive relationship to product and process-related environmental issues disclosure quality ($p \leq 0.10$) is revealed.

As for ownership structure, it can be observed that ownership concentration is significantly and negatively associated with disclosure quality of each of compliance with environmental laws and standards ($p \leq 0.01$) and environmental auditing ($p \leq 0.10$), while significantly and positively associated with disclosure quality of each of sustainability ($p \leq 0.10$) and other environmentally-related information ($p \leq 0.05$). However, institutional ownership is found to be significantly and positively associated with disclosure quality of each of compliance with environmental laws and standards ($p \leq 0.01$) and environmental auditing ($p \leq 0.05$), while significantly and negatively associated with disclosure quality of each of sustainability ($p \leq 0.05$) and other environmentally-related information ($p \leq 0.01$).

Results also reveal a strong significant positive relationship between total environmental disclosure quality and corporate characteristics including company size ($p \leq 0.01$) and industry, while a significant negative relationship to liquidity ($p \leq 0.05$). No significant relationship is found between total environmental disclosure quality and each of profitability, leverage, systematic risk and cross-listing. Concerning environmental disclosure categories, the results confirmed the significant positive association of each of company size and industry, as well as the significant negative association of liquidity, with the disclosure quality of most disclosure categories. However, for the other corporate characteristics including profitability, systematic risk and cross-listing, the results partially supported the insignificant relationship to the quality of some of the disclosure categories. Nevertheless, the insignificant relationship of leverage to disclosure quality is consistently confirmed for all environmental disclosure categories.

6.3.3.3 Further Analysis

A further analysis of the different dimensions or sub-qualities of total environmental disclosure quality, including comparability (type), understandability (direction), relevance (outlook) and reliability (verifiability), is undertaken. These disclosure sub-qualities are individually investigated so that a deeper insight into the different quality dimensions of the company's disclosure strategy is thoroughly depicted. Accordingly, the analysis accommodates both aggregated quality and disaggregated dimensional quality of environmental disclosures. Environmental disclosure quality of each of the different quality dimensions is used alternatively as the dependent variable. Corporate governance mechanisms are then regressed on total environmental disclosure quality as well as each of the different disclosure sub-qualities or quality dimensions, while controlling for corporate characteristics. In this regard, the break down of environmental disclosure quality provides a better overall picture of the governance relation to disclosure quality. Ordinary Least Squares (OLS) longitudinal panel regression with robust standard error is employed. The results of the Ordinary Least Squares (OLS) regression of corporate governance on environmental disclosure quality dimensions are shown in Table 6.13.

Table 6.13
OLS Longitudinal Panel Regression With Robust Standard Error
Of Corporate Governance On Environmental Disclosure Quality Dimensions

	Total Environmental Disclosure Quality		**Comparability (Type)**		**Understandability (Direction)**		**Relevance (Outlook)**		**Reliability (Verifiability)**	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Intercept	60.13***	0.000	13.65***	0.003	96.41***	0.000	43.83***	0.000	86.79***	0.000
BI	-0.02	0.388	0.00	0.960	-0.06	0.154	0.02	0.385	-0.03	0.282
RD	-1.90*	0.069	-2.24	0.372	-4.83	0.125	-0.38	0.616	-0.13	0.951
BS	-0.03	0.836	-0.07	0.750	0.08	0.830	0.00	0.969	-0.12	0.108
BM	0.20**	0.033	0.50***	0.003	0.36***	0.007	0.07	0.459	-0.12	0.403
E	0.01	0.566	0.03	0.172	-0.02	0.532	-0.01	0.357	0.03	0.187
CI	-0.01	0.128	-0.02**	0.038	0.01	0.325	-0.01	0.110	-0.03*	0.071
CD	0.02	0.110	0.04*	0.079	0.00	0.890	0.02	0.150	0.02	0.312
CERP	1.10	0.191	1.27*	0.077	1.79*	0.064	0.28	0.637	1.09	0.460
ACI	0.04	0.162	0.04	0.359	0.03	0.522	0.04*	0.052	0.03	0.658
RCI	-0.02	0.202	-0.02	0.498	-0.02	0.392	-0.05**	0.013	0.02	0.701
NCI	0.00	0.951	0.02	0.529	-0.01	0.791	0.02	0.312	-0.03*	0.086
OC	0.00	0.806	-0.07**	0.044	-0.05	0.196	-0.02	0.224	0.12***	0.004
IO	0.01	0.772	0.04	0.194	0.05	0.411	0.00	0.895	-0.07**	0.016
SZ	1.34*	0.099	3.65**	0.013	-0.31	0.806	0.76*	0.067	1.22	0.147
IND	1.33**	0.011	2.94***	0.002	1.51**	0.049	-0.51	0.274	1.38	0.117
PRO	0.33	0.592	0.73	0.184	0.19	0.781	0.16	0.742	0.21	0.853
LEV	0.05	0.887	1.07***	0.008	-1.11*	0.057	0.16	0.482	0.18	0.860
LIQ	-0.64**	0.021	0.03	0.893	-1.74**	0.016	0.31**	0.023	-1.13**	0.023
SR	0.83	0.297	-0.61	0.554	-0.04	0.931	2.32**	0.019	1.62	0.227
CL	-0.08	0.896	-0.91	0.410	0.08	0.938	-0.35	0.616	0.71	0.575
Adjusted R^2 (%)	15.90		28.49		8.72		9.25		4.86	

***$p \leq 0.01$, **$p \leq 0.05$, and *$p \leq 0.10$.

BI Board Independence, **RD** Role Duality, **BS** Board Size, **BM** Board Meetings, **E** Education, **CI** Community Influence, **CD** Cross-Directorships, **CERP** Corporate Environmental Responsibility (CER) Committee Presence, **ACI** Audit Committee Independence, **RCI** Remuneration Committee Independence, **NCI** Nomination Committee Independence, **OC** Ownership concentration, **IO** Institutional Ownership, **SZ** Size, **IND** Industry, **PRO** Profitability, **LEV** Leverage, **LIQ** Liquidity, **SR** Systematic Risk, **CL** Cross-Listing.

Table 6.13 depicts the results of Ordinary Least Squares (OLS) longitudinal panel regression with robust standard error of corporate governance on environmental disclosure quality dimensions. Regarding the comparability dimension, results show a significant positive association between the type of environmental disclosure and each of board meetings ($p \leq 0.01$), cross-directorships ($p \leq 0.10$) and the presence of corporate environmental responsibility (CER) committee ($p \leq 0.10$), while a significant negative association with each of community influence ($p \leq 0.05$) and ownership concentration ($p \leq 0.05$). As for the understandability dimension, results indicate a significant positive association between the direction of environmental disclosure and each of board meetings ($p \leq 0.01$) and corporate environmental responsibility (CER) committee presence ($p \leq 0.10$). Concerning the relevance dimension, results reveal a significant positive association between the outlook of environmental disclosure and audit committee independence ($p \leq 0.10$), while a significant negative association with remuneration committee independence ($p \leq 0.05$). As for the reliability dimension, results show a significant positive association between the verifiability of environmental disclosure and ownership concentration ($p \leq 0.01$), while a significant negative association with each of community influence ($p \leq 0.10$), nomination committee independence ($p \leq 0.10$) and institutional ownership ($p \leq 0.05$). Results also reveal a significant positive relationship between total environmental disclosure quality dimensions and corporate characteristics including company size, industry, leverage and systematic risk while a significant negative relationship to liquidity. No significant relationship is found between total environmental disclosure quality dimensions and each of profitability and cross-listing.

6.3.4 Discussion Of Statistical Results

A variety of statistical tests and analyses, including descriptive statistics, correlation analysis and regression analysis, are undertaken in order to measure the extent and trend in corporate environmental disclosure quality and to examine the relationship between corporate governance mechanisms and the quality of corporate environmental disclosure practices in UK companies' annual reports, while controlling for corporate characteristics. The results of the different statistical

analyses are discussed and analyzed in terms of the theoretical framework adopted and conclusions are drawn from statistical findings.

The results of the descriptive statistics showed that there is a relatively high level of corporate environmental disclosure quality in the UK (72.74%), indicating that companies are demonstrating their accountability by which they are made responsive to the rights and needs of various stakeholders through reducing information asymmetry. This, in turn, implies that managers are acting in the best interests of stakeholders by attempting to satisfy their environmental information needs. Furthermore, there is a slightly increasing trend in the quality of environmental disclosure practices over the study period. Such an increasing trend over time emphasizes the increased awareness of corporate environmental responsibility by UK listed companies. This increase is associated with the general increase in corporate reporting as guided by the recommendations set by professional accounting bodies and standard setters such as Global Reporting Initiative (GRI). In addition, increased corporate environmental responsibility can be attributed to the adoption of the relevant codes of best practice following the issuance of the Combined Code (2003) of corporate governance in the UK.

Moreover, compliance with environmental laws and standards disclosure steadily represents the highest disclosure quality of 74.52%, given that specific high quality information is necessary to report on the actions taken by the company in order to show commitment to and conformity with statutory environmental requirements and, hence, accountability to various stakeholders. On the other hand, environmental auditing disclosure represents the lowest disclosure quality of 71.54%. This result is expected given that environmental auditing disclosure is the product of the environmental auditing process that is characterized by "lack of mandatory regulation, sketchy adoption of voluntary guidelines, and variable quality of verification" (Hammond and Miles, 2004). In addition, the maximum average disclosure quality is 86.27%, while the minimum average disclosure quality is 45.83%, indicating a great variation in the quality of environmental disclosure practices among the sample companies. This finding might be the effect of examining a wide range of companies with different sizes and varying degrees of environmental sensitivity.

Descriptive statistics of the different corporate governance mechanisms examined are considered to be reasonable following the issuance of the Combined Code (2003) of corporate governance in the UK. It may be worth mentioning that although the code is voluntary, in that it provides only guidelines of best practice of corporate governance, London Stock Exchange listing rules require companies to adhere to corporate governance principals. UK listed companies follow the Combined Code's (2003) rule of "comply or explain", with small companies having an excuse for noncompliance if adherence is infeasible or impractical. This is particularly true given the wide variation in most corporate governance mechanisms, ranging from a minimum of 0 to a maximum of 100%. Such great variation can also be attributed to the unfamiliarity by some companies with the adequate application of the principles of the newly issued code succeeding the period under investigation.

The results of both correlation and regression analyses revealed a significant association between environmental disclosure quality and most corporate governance mechanisms. Two corporate governance variables were found to be statistically significant in impacting upon overall corporate environmental disclosure quality, while controlling for corporate characteristics. Specifically, higher environmental disclosure quality is associated with the separation of the dual role of CEO and chairman as well as with higher frequency of board meetings. In addition, it appears that other corporate governance mechanisms are significant at some categorical levels of environmental disclosure quality. In other words, for some disclosure categories, higher environmental disclosure quality is also associated with lower percentage of independent non-executive directors on the board, lower percentage of community influential directors, greater cross-directorships of board members, presence of board-level corporate environmental responsibility (CER) committee or responsible, higher percentage of independent non-executive directors on the audit committee, lower percentage of independent non-executive directors on the remuneration committee, lower percentage of independent non-executive directors on the nomination committee, lower percentage of ownership concentration and higher percentage of institutional ownership. Neither board size nor directors' education show a significant association with environmental disclosure quality, although the positive relationship is in the expected direction for education, but not for board size where a negative relationship is documented.

The adjusted R Squared of the regression model is 15.90% indicating that 15.90% of the changes in total environmental disclosure quality is explained by the changes in its examined determinants. The value of R Squared is considered acceptable in comparison to the findings of previous environmental disclosure literature. For example, the reported R Squared is comparable to that of Halme and Huse (1997) as 21.2%, Marshall *et al.* (2011) as18%, Peters and Romi (2011) as 25%, Post *et al.* (2011) as 24% and Rupley *et al.* (2011) as 25.73%. In the context of social disclosures, the reported R Squared is comparable to that of Hassan (2010) as 12.18% and Prado-Lorenzo (2009) as 22%, while in the context of voluntary disclosures in general, the reported R Squared is comparable to that of Gul and Leung (2004) as 19%, Lim *et al.* (2007) as 19.33% and O'Sullivan *et al.* (2008) as 12.4% and 10%.

The proportion of independent non-executive directors on the board, although found to have insignificant relationship to total environmental disclosure quality, is significantly and negatively associated with the disclosure quality of environmental policies. While this result is contrary to expectation, it suggests that where companies lack board independence, they mitigate the agency problems associated with this lack of independence by providing quality environmental disclosures, so that stakeholders' rights to information are not affected. Another possible explanation for this finding may be inadequate application of corporate governance code during the period of this study as the code was newly emerged. In this regard, directors' true independence may be questionable and the existence of grey directors on the board might be problematic. Accordingly, directors' tenure should be taken into consideration when assessing board independence. Otherwise, decisions tuning occurs which might not be in the best interests of stakeholders. However, this result is consistent with the findings of Barako *et al.* (2006) and Haniffa and Cooke (2002), who provide evidence of negative association of outside directors on the board to voluntary disclosure. Although Brammer and Pavelin (2008) were unable to confirm a significant relationship, Rupley *et al.* (2011) documented a positive association between the proportion of independent non-executive directors and environmental disclosures quality.

Role duality showed a significant negative association with total environmental disclosure quality as well as with the disclosure quality of each of environmental policies, product and process-related environmental issues and sustainability. In line

with the stakeholder-agency theoretical framework adopted, the separation of the dual roles of CEO and chairman is likely to provide necessary checks and balances over management's performance (Fama and Jensen, 1983) and, accordingly, decrease the possibility of restricting information flow (McKendall *et al.*, 1999) and withholding unfavorable information from reaching stakeholders (Ho and Wong, 2001). This result is consistent with earlier evidence on the relationship of role duality to voluntary disclosure (e.g. Forker (1992); Gul and Leung, 2004; Huafang and Jianguo, 2007), although no evidence exists of such relationship to environmental disclosure (e.g. Al Arussi *et al.*, 2009; Michelon and Parbonetti, 2010; Rupley *et al.*, 2011).

Board size displayed no significant association with total environmental disclosure quality as well as with the disclosure quality of all environmental disclosure categories. In addition, such insignificant association is negative, which is contrary to expectation. A possible explanation for this finding may be the existence of an inverted "U" shaped- relationship to environmental disclosure, with an optimal board size existing midway, as assumed by Cormier *et al.* (2011). Below this optimal board size, there is a positive relation between board size and information asymmetry followed by a negative relationship. Descriptive statistics indicated that large board size has been traditional practice in UK companies over time. Too large or excessively sized boards may be plagued with agency conflicts and monitoring problems. This due to the lack of coordination associated with a large board, which slows down the decision making process and decreases board efficiency (Jensen, 1993; Lipton and Lorsch, 1992; Yermack, 1996). The finding is also in line with the evidence from prior studies, where Halme and Huse (1997) and Michelon and Parbonetti (2010) were unable to confirm a significant relationship of board size to environmental disclosures. Nevertheless, evidence of the existence of a positive association between board size and environmental disclosure quality is documented by Cormier *et al.* (2011).

Board meetings frequency has a significant positive association with total environmental disclosure quality as well as with the disclosure quality of each of environmental policies and product and process-related environmental issues. This result can be interpreted in the context of the proposed framework, as an increasing board activity, represented by meeting frequency, influences the board's ability to act

as an effective monitoring mechanism in mitigating agency conflicts (Xie *et al.*, 2003). Increased monitoring is expected to result in reduced information asymmetry and lower agency costs, thereby increasing disclosures (Nelson *et al.*, 2010). In addition, an active board that meets more often is able to devote more time to issues such as social and environmental responsibility, being reflected in an increased quality of social and environmental information. Although not previously addressed in environmental disclosure research, Laksmana (2008) documents that a board having more time to meet leads to increased voluntary disclosure and transparency.

Directors' education has insignificant association with total environmental disclosure quality. This result is confirmed for the disclosure quality of all of the disclosure categories. Although this finding is contrary to expectation, the positive relationship is in the expected direction as to overall environmental disclosure quality and the disclosure quality of almost all of the disclosure categories. An educated manager can have a broader perspective and superior pattern of thinking and, thus, is more likely understand the wider interests of various stakeholders (Akhtaruddin and Abdur Rouf, 2011; Welford, 2007). However, the insignificance of educational background to environmental disclosure quality suggests the need for directors' environmental education in addition to accounting and/or business education. Currently, no prior empirical evidence exists on the relationship between directors' education and a direct measure of corporate environmental disclosure. However, in the context of voluntary disclosure in general, although Haniffa and Cooke (2002) found insignificant relationship, Akhtaruddin and Abdur Rouf (2011) documented a significant positive association between board members qualified in business and accounting and voluntary disclosure.

Community influence, although found to have insignificant relationship to total environmental disclosure quality, is significantly and negatively associated with the disclosure quality of product and process-related environmental issues. While this finding is contrary to expectation, it suggests that where directors lack community influence, they mitigate the agency problems associated with this lack of information access by providing quality environmental disclosures, so that stakeholders' rights to information are not affected. However, the relationship of community influence to environmental disclosure might not be evident where other forms of directors'

qualifications and experience act as substituting factors affecting information provision. Other possible explanations for this finding are that directors with such community influence and relationship networks could spread themselves too thinly or that they have direct relationships and contacts with stakeholders through which information dissemination takes place as opposed to annual report disclosures. Empirical evidence by Michelon and Parbonetti (2010) showed that the proportion of community influential directors on the board positively affects sustainability, environmental, and strategic disclosure, given that no other forms of directors' qualifications and experience have been employed.

Cross-directorships have insignificant relationship to total environmental disclosure quality but have significant positive relationship to disclosure quality of compliance with environmental laws and standards, sustainability and other environmentally-related information. This result can be interpreted in the context of the proposed framework, as an increasing proportion of directors on the board with cross-directorships better equips boards to carry out their governance roles as directors gain the necessary skills and experience needed to understand and address the wider environmental responsibilities towards various stakeholders. Consequently, cross-directorships have important implications for disclosure practices through greater access to information (Haniffa and Cooke, 2002). However, the relationship of cross-directorships to the overall environmental disclosure quality might not be evident as directors serving on too many boards could spread themselves too thinly. The finding of a significant positive relationship is consistent with that of Haniffa and Cooke (2005) and Rupley *et al.* (2011), who provide evidence of significant positive association between cross-directorships and each of corporate social and environmental disclosures respectively.

The presence of corporate environmental responsibility (CER) committee has insignificant relationship to total environmental disclosure quality while a strong significant positive relationship to product and process-related environmental issues disclosure quality. Consistent with the adopted theoretical framework, companies with a CER committee are more likely to disclose environmental information because the committee members will require management to demonstrate accountability by ensuring that the firm is following well-established environmental reporting

guidelines and recommendations. As the CER committee is responsible for ensuring the quality of the company's environmental reporting policies, the establishment of such committee can be regarded as a means of addressing stakeholders' interests and responding to their expectations (Michelon and Parbonetti, 2010; Peters and Romi, 2011). However, such relationship is strongly evident as to the disclosure quality of product and process-related environmental issues, where a technical expertise on these environmental issues is necessary for information processing and reporting. Although McKendall *et al*. (1999), Michelon and Parbonetti (2010) and Rupley *et al*. (2011) were unable to confirm a significant relationship, evidence of the existence of a significant positive association between the presence of a CER committee on the board and corporate environmental disclosures is documented by Hassan (2010) and Peters and Romi (2011).

Audit committee independence, although found to have insignificant relationship to total environmental disclosure quality, is significantly and positively associated with the disclosure quality of each of environmental policies, compliance with environmental laws and standards and other environmentally-related information. Independence of the audit committee members can significantly contribute to the committee's effectiveness (Xie *et al*., 2003), as it enables the committee to carry out its responsibilities objectively (Abbott *et al*., 2004). However, a possible explanation for an insignificant relationship to overall environmental disclosure quality may be due to lack of environmental audit undertaken by companies and, consequently, the role of independent non-executive directors on the audit committee may not be evident. Another possible explanation for this finding can be attributed to the existence of grey directors whose true independence may be questionable. The finding of a significant positive association between audit committee independence and the disclosure quality of some environmental disclosure categories is in line with earlier evidence by O'Sullivan *et al*. (2008) as to voluntary disclosure practices.

Remuneration committee independence revealed no significant association with total environmental disclosure quality while a significant negative relationship is detected between remuneration committee independence and product and process-related environmental issues disclosure quality. While this result is contrary to expectation, it suggests that agency problems associated with lack of directors' independence on the

remuneration committee are mitigated by providing more environmental disclosures. However, the insignificant relationship to overall environmental disclosure quality can be interpreted in terms of a lack of linkage between pay and environmental performance in setting remuneration and, consequently, the role of independent non-executive directors on the remuneration committee may not be evident. Another possible explanation for this finding can be attributed to the existence of grey directors whose true independence may be questionable. The finding of a negative association between a remuneration committee independence and categorical disclosure quality is contrary to earlier evidence by O'Sullivan *et al.* (2008) as to voluntary disclosure practices, who documented a positive association.

Nomination committee independence revealed no significant association with total environmental disclosure quality while a significant negative relationship is detected between nomination committee independence and environmental auditing disclosure quality. While this result is contrary to expectation, it suggests that agency problems associated with lack of directors' independence on the nomination committee are mitigated by providing more environmental disclosures. Another possible explanation for this finding can be attributed to the existence of grey directors whose true independence may be questionable. No prior empirical evidence exists on the relationship between nomination committee independence and corporate environmental disclosure. Nevertheless, in the context of voluntary disclosure in general, Cheung *et al.* (2010) found that companies with board-level committees including a nomination committee tend to more transparent.

Ownership concentration showed insignificant negative association with total environmental disclosure quality but is significantly and negatively associated with compliance with environmental laws and standards disclosure quality. This result can be interpreted in the context of the proposed framework, as an increasing concentration of ownership in the hands of a few large shareholders is associated with less agency conflicts and, hence, a decreasing likelihood of companies disclosing additional quality information on their social and environmental performance. However, such relationship to total environmental disclosure quality might not be evident as a measure of overall ownership may not capture the unique individual interests, and hence the influence, of each particular shareholders group. The finding

of a significant negative association at the categorical level of environmental disclosure is consistent with that of Brammer and Pavelin (2008) and Cormier *et al.* (2005), who provide evidence of significant negative association of ownership concentration with environmental disclosure quality in annual reports. Evidence of such relationship is also documented by both Reverte (2009) and Prado-Lorenzo *et al.* (2009) as to corporate social responsibility disclosure and by Barako *et al.* (2006) in the context of corporate voluntary disclosure in general.

Institutional ownership, although found to have insignificant relationship to total environmental disclosure quality, is significantly and positively associated with compliance with environmental laws and standards disclosure quality but significantly and negatively associated with other environmentally-related information disclosure quality. The positive relationship is in the expected direction, suggesting that institutional investors have strong incentives to monitor corporate disclosure practices and influence corporate values due to their large ownership stake (Barako *et al.*, 2006) and that they may consider environmental issues to be important as a means of long-term value creation (Halme and Huse, 1997; Prado-Lorenzo *et al.*, 2009; Welford, 2007). However, a possible explanation for the existence of an insignificant relationship to overall environmental disclosure quality may be due to the substantial representation of institutional investors in UK companies' blockholdings. In other words, this result is expected given that institutional ownership constitutes the major and dominant form of blockholdings. Institutional shareholders, thus, represent a key stakeholder group who are more sophisticated (Guan *et al.*, 2007), have power (O'Sullivan *et al.*, 2008), have access to the information they need (Cormier *et al.*, 2005) and, therefore, can obtain the required information from alternative sources other than corporate disclosure (Berthelot *et al.*, 2003). Another possible explanation for this finding may be due to the lack of stakeholder engagement in the corporate governance process and, consequently, the role of institutional investors in shaping corporate disclosure decisions may not be evident. The finding of insignificant relationship to total environmental disclosure quality is consistent with that of Rupley *et al.* (2011) who found no evidence of a relation between institutional shareholders and any of the measures of voluntary environmental disclosures. Similarly, the finding of a significant positive association between institutional investors and the

disclosure quality of categorical environmental disclosure is in line with earlier evidence by Barako *et al.* (2006) in the context of corporate voluntary disclosures.

Results also reveal a significant positive relationship between total environmental disclosure quality and corporate characteristics including company size and industry, while a significant negative relationship to liquidity. No significant relationship is detected between total environmental disclosure quality and each of profitability, leverage, systematic risk and cross-listing. Concerning environmental disclosure categories, the results confirmed the significant positive association of each of company size and industry, as well as the significant negative association of liquidity, with the disclosure quality of some disclosure categories. Similarly, the insignificant relationship of the other corporate characteristics, including profitability, leverage and systematic risk, to disclosure quality is consistently confirmed for all environmental disclosure categories. However, for cross-listing, the results partially supported the insignificant relationship for most of the disclosure categories, but not for others where a significant positive association is detected.

These results are consistent with the dominant trend in previous literature, where the results of the majority of previous studies concerning corporate characteristics indicate that there is a significant positive association between corporate environmental disclosure and each of company size (e.g. Adams *et al.*, 1998; Brammer and Pavelin, 2008; Cormier *et al.*, 2011; Cormier *et al.*, 2005; Deegan and Gordon, 1996; Gray *et al.*, 2001; Hackston and Milne, 1996; Magness, 2006; Patten, 2002; Peters and Romi, 2011; Rupley *et al.*, 2011; Stanny and Ely, 2008) and industry (e.g. Adams *et al.*, 1998; Brammer and Pavelin, 2008; Campbell, 2004; Cormier *et al.*, 2005; Deegan and Gordon, 1996; García-Ayuso and Larrinaga, 2003; Gray *et al.*, 2001; Hackston and Milne, 1996; Halme and Huse, 1997), while there is no association between corporate environmental disclosure and profitability (e.g. Brammer and Pavelin, 2008; García-Sánchez, 2008; Hackston and Milne, 1996; Michelon and Parbonetti, 2010; Peters and Romi, 2011; Stanny and Ely, 2008).

However, results of prior literature on the association of environmental disclosure with other corporate characteristics are mixed. Consistent with the current study's findings, the insignificant association between environmental disclosure and leverage is previously documented (e.g. Al Arussi *et al.*, 2009; Branco and Rodrigues, 2008;

Cormier *et al.*, 2005; Ho and Taylor, 2007; Haniffa and Cooke 2005; Michelon and Parbonetti, 2010; Peters and Romi, 2011; Reverte, 2009; Stanny and Ely, 2008), while the significant negative association of liquidity to environmental disclosure is previously documented by Ho and Taylor (2007) as to triple bottom line reporting and by Gul and Leung (2004) as to voluntary disclosure in general. The finding of insignificant association between environmental disclosure and systematic risk is similar to that of García-Ayuso and Larrinaga (2003) and Michelon and Parbonetti (2010). In line with earlier evidence, the significant positive association between categorical environmental disclosure and cross-listing is documented by Haniffa and Cooke (2005), Peters and Romi (2011) and Reverte (2009), although Michelon and Parbonetti (2010) were unable to detect the significance of such relationship as to total environmental disclosure.

From the above discussion, it can be noticed that there is a high level of agreement between the results of OLS and GLS regressions about the significance of corporate governance variables as well as corporate characteristics variables. Similar GLS regression results are found as in the previous OLS regression analysis. Although the significance of additional corporate governance mechanisms, including directors' community influence, cross-directorships, the presence of corporate environmental responsibility (CER) committee, audit committee independence and remuneration committee independence, is detected in impacting upon total environmental disclosure quality, such significance was already documented in terms of categorical environmental disclosure quality in the OLS regression analysis. Nevertheless, the different regression analyses agree as to the direction of such relationships. Generally, the results of the GLS regression are largely consistent with results and findings of the main OLS regression.

A further analysis of the different dimensions or sub-qualities of total environmental disclosure quality provided a deeper insight into the different quality dimensions of the company's disclosure strategy. For the comparability dimension, results show a significant positive association with each of board meetings, cross-directorships and corporate environmental responsibility (CER) committee presence, while a significant negative association with each of community influence and ownership concentration. For the understandability dimension, results indicate a significant positive association

with board meetings and corporate environmental responsibility (CER) committee presence. For the relevance dimension, results reveal a significant positive association with audit committee independence, while a significant negative association with remuneration committee independence. For the reliability dimension, results show a significant positive association with ownership concentration, while a significant negative association with each of community influence, nomination committee independence and institutional ownership. Although board independence and role duality are no longer significant, results remain substantively the same either on the aggregate disclosure quality level or on the categorical disclosure quality level. However, it appears that the comparability dimension or the type of disclosure is the key quality dimension associated with most corporate governance mechanisms in explaining corporate environmental disclosure quality. This inference is reinforced by referring to the explanatory power of the comparability model of 28.49%, as compared to those of the understandability, relevance and reliability models of 8.72%, 9.25% and 4.86% respectively.

Accordingly, the results of the panel regression analysis agree with the research hypotheses regarding the existence of a significant positive relationship between environmental disclosure quality and board meetings (H_{4c}), while a negative significant relationship to role duality (H_{2c}). In addition, research hypotheses regarding the significant relationship of environmental disclosure quality to other corporate governance mechanisms, including board independence (H_{1c}), community influence (H_{6c}), cross-directorships (H_{7c}), corporate environmental responsibility (CER) committee presence (H_{8c}), audit committee independence (H_{9c}), remuneration committee independence (H_{10c}), nomination committee independence (H_{11c}), ownership concentration (H_{12c}) and institutional ownership (H_{13c}), are partially supported at some categorical levels of environmental disclosure quality. Moreover, the results partially support some of these research hypotheses, in that the positive relationships are in the expected direction. Contrary to expectation, however, the existence of a positive relationship between environmental disclosure quality and each of board independence, community influence and remuneration committee independence was not supported, where a negative relationship is found. Similarly, the research hypothesis regarding the association between environmental disclosure quality and directors' education (H_{5c}) is partially supported, in that the positive

relationship is in the expected direction although it is insignificant. Nevertheless, the research hypothesis regarding the association between environmental disclosure quality and board size (H_{3c}) is totally unsupported as the relationship is neither positive nor significant.

Furthermore, the results of the panel regression analysis agree with most of the research hypotheses concerning the variability in the relationship of each of the corporate governance mechanisms to disclosure quality among the different environmental disclosure categories. Specifically, the relationship between environmental disclosure quality and each of board independence (H_{1d}), role duality (H_{2d}), board size (H_{3d}), board meetings (H_{4d}), directors' community influence (H_{6d}), cross-directorships (H_{7d}), the presence of corporate environmental responsibility (CER) committee (H_{8d}), audit committee independence (H_{9d}), remuneration committee independence (H_{10d}), nomination committee independence (H_{11d}), ownership concentration (H_{12d}) and institutional ownership (H_{13d}) differs among the different categories of environmental disclosure. However, the research hypothesis concerning the variability in such relationship is not relatively supported for directors' education (H_{5d}). In other words, consistent relationship among almost all of the different environmental disclosure categories was documented, wherein disclosure quality has dominant insignificant positive association with education.

In conclusion, the overall results provide support for the study's general argument that corporate governance plays an important role in determining how companies mitigate agency problems and respond to the needs and interests of various stakeholder groups and, consequently, in determining the quality of environmental disclosures in the annual reports. In this respect, sound systems of corporate governance are serving as both monitoring and accountability mechanisms, by which managers' opportunistic manipulation is controlled and companies are made responsive to the rights and needs of stakeholders, thereby reducing information asymmetry or the information expectation gap. In other words, the stakeholder-agency theoretical framework adopted by the current study is greatly supported by the study's findings.

6.3.5 Sensitivity Analysis

A number of sensitivity tests are performed to check the robustness of the main analysis and, hence to attest the reliability of the results. Sensitivity analysis is aimed at examining how sensitive the results and findings are towards using alternative model specifications or changing the statistical tests in the determination environmental disclosure quality. Two types of robustness check are undertaken. First, in addition to using a composite measure of environmental disclosure quality, the different categories of environmental disclosures are integrated into the analysis in order to better portray the different areas and aspects of the company's disclosure strategy. Moreover, the different sub-qualities of total environmental disclosure quality are individually investigated so that a deeper insight into the different quality dimensions of the company's disclosure strategy is thoroughly depicted. Second, alternative regression analyses are carried out to check the sensitivity of the main statistical regression test. Hence, in addition to the main Ordinary Least Squares (OLS) regression analysis, Generalized Least Squares (GLS) regression analysis is also undertaken to allow for possible unequal variances of the observations as well as for any potential degree of correlation between the observations. Moreover, sensitivity analysis using pooled cross-sectional Ordinary Least Squares (OLS) regression with robust standard error is employed as a robustness check of the main regression analysis.

While a composite or summary measure, that collapses different disclosure categories into a single value, is useful in associating disclosure quality with other variables of interest, the analysis of the different disclosure categories as well as the different quality dimensions provide deeper understanding of and richer insights into disclosure quality (see Beattie *et al.*, 2004), thereby help to comprehensively profile the disclosure quality strategies adopted by the company (Beretta and Bozzolan, 2004). Aggregated measures shift attention away from what is and what is not being reported in terms of the different themes or items being reported and from the quality of such items (Chapman and Milne, 2004). Accordingly, the current study reports both aggregated quality and disaggregated categorical quality of environmental disclosures. Environmental disclosure quality of each of the different disclosure categories is used alternatively as the dependent variable. Corporate governance

mechanisms are then regressed on total environmental disclosure quality as well as the disclosure quality of each of the different disclosure categories.

Moreover, a further analysis of the different dimensions or sub-qualities of total environmental disclosure quality is undertaken. Accordingly, the current study reports both aggregated quality and disaggregated dimensional quality of environmental disclosures. Environmental disclosure quality of each of the different quality dimensions is used alternatively as the dependent variable. Corporate governance mechanisms are then regressed on total environmental disclosure quality as well as each of the different disclosure sub-qualities or quality dimensions. In this regard, the break down of environmental disclosure quality either by category or dimension provides a better overall picture of the governance relation to disclosure quality. Taken together, results from these various specifications are largely consistent with total regression results. In other words, although the relationship of corporate governance to disclosure quality differs across the different disclosure categories as well the different disclosure quality dimensions, results do not alter the main inferences drawn from total environmental disclosure quality model reported findings.

Generalized Least Squares (GLS) regression analysis is also undertaken to allow for possible unequal variances of the observations as well as for any potential degree of correlation between the observations. GLS regression analysis makes use of the information pertaining to the unequal variability of the dependent variable as opposed to OLS regression analysis that assigns equal weight to each observation (See Gujarati, 2003). Similar results are found as in the previous OLS regression analysis. Although the significance of additional corporate governance mechanisms is detected in impacting upon total environmental disclosure quality, such significance was already documented in terms of categorical environmental disclosure quality in the OLS regression analysis. Generally, the results and findings are largely consistent with results of the main OLS regression. Moreover, sensitivity analysis using pooled cross-sectional Ordinary Least Squares (OLS) regression with robust standard error is employed as a robustness check of the main regression analysis. Contrary to panel data analysis, pooled regression analysis deals with large number of observations as one unit as opposed to data grouping. The results of the pooled cross-sectional Ordinary Least Squares (OLS) regression are shown in Table 6.14.

Table 6.14
Pooled Cross Sectional OLS Regression With Robust Standard Error Of Corporate Governance On Environmental Disclosure Quality

	TED		**EP**		**PPEI**		**CELS**		**EA**		**S**		**OEI**	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Intercept	58.52***	0.000	52.68***	0.000	52.44***	0.000	74.15***	0.000	69.40***	0.000	65.94***	0.000	61.29***	0.000
BI	-0.02	0.412	-0.03	0.288	0.01	0.692	0.01	0.724	0.01	0.580	0.00	0.997	-0.01	0.656
RD	-1.84	0.117	-1.39	0.330	-5.04***	0.004	2.11	0.245	-0.94	0.364	-6.04	0.136	0.64	0.802
BS	-0.06	0.526	-0.03	0.797	-0.16	0.275	-0.04	0.811	0.00	0.984	0.03	0.885	-0.07	0.564
BM	0.21***	0.003	0.28***	0.001	0.24**	0.013	0.04	0.681	-0.01	0.918	0.00	0.987	0.02	0.813
E	0.01	0.406	0.03*	0.097	0.01	0.588	-0.01	0.590	0.01	0.523	0.01	0.752	0.00	0.830
CI	-0.01	0.106	-0.01	0.169	-0.03**	0.014	-0.01	0.212	0.00	0.968	-0.03**	0.048	-0.01	0.432
CD	0.02*	0.088	0.02	0.222	0.00	0.958	0.04**	0.028	-0.01	0.458	0.08***	0.000	0.03**	0.041
CERP	1.14***	0.003	0.50	0.299	2.31***	0.000	1.86***	0.002	0.30	0.496	0.87	0.246	0.26	0.627
ACI	0.05**	0.016	0.08***	0.002	0.05*	0.064	0.04	0.196	0.04*	0.065	0.01	0.777	0.02	0.442
RCI	-0.03**	0.045	-0.04*	0.054	-0.07***	0.001	-0.01	0.689	-0.02	0.310	-0.01	0.527	0.00	0.928
NCI	0.00	0.828	0.00	0.939	0.02	0.133	-0.01	0.677	-0.03**	0.037	-0.02	0.445	-0.01	0.595
OC	0.00	0.915	0.00	0.820	-0.01	0.668	-0.02	0.468	-0.03	0.131	0.04	0.271	0.03	0.169
IO	0.01	0.614	0.01	0.518	0.02	0.396	0.03	0.406	0.05**	0.031	-0.02	0.564	-0.04	0.112
SZ	1.48***	0.000	1.76***	0.000	2.76***	0.000	-0.84	0.183	0.21	0.596	0.69	0.397	1.89***	0.000
IND	1.32***	0.000	1.77***	0.000	0.11	0.829	1.12**	0.033	0.70	0.105	-0.46	0.522	1.68***	0.001
PRO	0.62	0.161	0.67	0.221	1.59**	0.036	0.57	0.464	0.56	0.184	-1.06	0.300	-0.25	0.718
LEV	0.05	0.896	0.45	0.269	0.00	0.995	-0.36	0.513	-0.10	0.813	-0.21	0.769	0.04	0.946
LIQ	-0.64**	0.017	-0.47	0.135	-0.69*	0.058	-1.49***	0.000	-0.26	0.387	-0.35	0.360	-1.08***	0.004
SR	1.01**	0.046	1.67***	0.006	1.51**	0.042	1.45**	0.042	0.17	0.761	1.01	0.353	-0.13	0.840
CL	-0.01	0.986	-0.05	0.945	-0.86	0.348	1.67*	0.071	1.46**	0.025	-1.90	0.154	-0.35	0.684
R^2 (%)	16.05		14.37		18.10		9.48		4.90		9.70		11.04	

***$p \leq 0.01$, **$p \leq 0.05$, and *$p \leq 0.10$.

TED Total Environmental Disclosure, **EP** Environmental Policies, **PPEI** Product and Process-Related Environmental Issues, **CELS** Compliance with Environmental Laws and Standards, **EA** Environmental Auditing, **S** Sustainability, **OEI** Other Environmentally-Related Information, **BI** Board Independence, **RD** Role Duality, **BS** Board Size, **BM** Board Meetings, **E** Education, **CI** Community Influence, **CD** Cross-Directorships, **CERP** Corporate Environmental Responsibility (CER) Committee Presence, **ACI** Audit Committee Independence, **RCI** Remuneration Committee Independence, **NCI** Nomination Committee Independence, **OC** Ownership concentration, **IO** Institutional Ownership, **SZ** Size, **IND** Industry, **PRO** Profitability, **LEV** Leverage, **LIQ** Liquidity, **SR** Systematic Risk, **CL** Cross-Listing.

Table 6.14 displays the results of pooled cross-sectional Ordinary Least Squares (OLS) regression with robust standard error of corporate governance on environmental disclosure quality. The results of the pooled regression showed approximately the same R Squared as the panel data regression analysis indicating that the pooled regression has the same strength of the main panel regression. Similar results are found as in the panel data regression analysis.

Although the significance of additional corporate governance mechanisms, including cross-directorships, corporate environmental responsibility (CER) committee presence, audit committee independence and remuneration committee independence, is detected in impacting upon total environmental disclosure quality, such significance was already documented in terms of categorical environmental disclosure quality in the main regression analysis. While the significance of role duality to total environmental disclosure quality is marginally diminishing, evidence of such significance still exists in terms of categorical environmental disclosure quality. Nevertheless, the different regression analyses agree as to the direction of such relationships. Generally, the results and findings are largely consistent with results of the main OLS regression. Accordingly, the pooled regression indicates that the results of the panel data analysis are not sensitive to changing the type of statistical test employed. Moreover, the selected panel data analysis is well fitted with the examined data.

In summary, these sensitivity analyses show general consistency with the overall findings. Taken together, the results of using alternative model specifications as well as the results of changing the statistical tests in the determination environmental disclosure quality do not alter the main inferences drawn from the reported findings of the aggregate model specification and the main statistical analysis. In this regard, the sensitivity analysis confirms the reliability of the results and findings and, hence, supports the generalization of such results.

6.4 CONCLUSION

This chapter presents the second part of the empirical work aimed at quantitatively investigating the relationship between corporate governance mechanisms and the quality of corporate environmental disclosure practices in UK companies' annual reports. A variety of statistical tests and analyses, including descriptive statistics, correlation analysis and regression analysis, are undertaken in order to measure the extent and trend in corporate environmental disclosure quality and to examine the relationship in question, while controlling for corporate characteristics. Finally, sensitivity analysis is carried out to check the robustness of the main regression analysis. The results are discussed and analyzed in terms of the theoretical framework adopted and conclusions are drawn from statistical findings.

Descriptive statistics showed that there is a relatively high level of corporate environmental disclosure quality in the UK, indicating that companies are demonstrating their accountability by which they are made responsive to the rights and needs of various stakeholders. Furthermore, there is a slightly increasing trend in the quality of environmental disclosure practices over the study period, emphasizing the increased awareness of corporate environmental responsibility by UK listed companies over time. Moreover, compliance with environmental laws and standards disclosure steadily represents the highest disclosure quality, while environmental auditing disclosure represents the lowest disclosure quality. In addition, there is a great variation in the quality of environmental disclosure practices among the sample companies. This finding might be the effect of examining a wide range of companies with different sizes and varying degrees of environmental sensitivity as indicated by the descriptive statistics of corporate characteristics. Descriptive statistics of corporate governance mechanisms are considered reasonable following the issuance of the Combined Code (2003) of corporate governance in the UK.

Results also revealed a significant association between environmental disclosure quality and most corporate governance mechanisms. Specifically, higher environmental disclosure quality is associated with the separation of the dual role of CEO and chairman as well as with higher frequency of board meetings. In addition, it appears that other corporate governance mechanisms are significant at some categorical levels of environmental disclosure quality. In other words, for some

disclosure categories, higher environmental disclosure quality is also associated with lower percentage of independent non-executive directors on the board, lower percentage of community influential directors, greater cross-directorships of board members, presence of board-level corporate environmental responsibility (CER) committee or responsible, higher percentage of independent non-executive directors on the audit committee, lower percentage of independent non-executive directors on the remuneration committee, lower percentage of independent non-executive directors on the nomination committee, lower percentage of ownership concentration and higher percentage of institutional ownership. Neither board size nor directors' education show a significant association with environmental disclosure quality, although the positive relationship is in the expected direction for education, but not for board size where a negative relationship is documented.

A further analysis of the different sub-qualities of total environmental disclosure quality provided a deeper insight into the different quality dimensions of the company's disclosure strategy. Although board independence and role duality are no longer significant, results remain substantively the same either on the aggregate disclosure quality level or on the categorical disclosure quality level. However, it appears that the comparability dimension or the type of disclosure is the key quality dimension associated with most corporate governance mechanisms in explaining corporate environmental disclosure quality.

In conclusion, the overall results reinforce the study's general argument that corporate governance plays an important role in determining how companies mitigate agency problems and respond to the needs and interests of various stakeholder groups and, consequently, in determining the quality of environmental disclosures in the annual reports. The significant association between environmental disclosure quality and most corporate governance characteristics indicates the appropriate application of the corporate governance concepts in the UK context following the launching of the new paradigm in the corporate governance code, which in turn supports the quality of environmental disclosure. However, the insignificance of some corporate governance characteristics indicates the need for some attention either in revising the principles of the corporate governance code or in their application. In this respect, sound systems of corporate governance are serving as both monitoring and accountability

mechanisms, by which managers' opportunistic manipulation is controlled and companies are made responsive to the rights and needs of stakeholders, thereby reducing information asymmetry or the information expectation gap. In other words, the stakeholder-agency theoretical framework adopted by the current study is greatly supported by the study's findings.

Chapter 7

CONCLUSION

CHAPTER SEVEN

CONCLUSION

7.1 INTRODUCTION

The increasing global concern for the environment and the consequent academic interest in researching corporate environmental disclosure practices have given tremendous impetus for initializing the current research. In a parallel movement, corporate governance has recently become one of the most distinctive features of modern corporations. Corporate environmental disclosure is, arguably, one of the greatest challenges facing the implementation of corporate governance. In this respect, environmental disclosure can be regarded as a means of ensuring sound corporate governance that integrates transparency in its environmental performance and promotes the notion of accountability to various stakeholder groups. Hence, there is a need to consider the relationship between a company and its stakeholders, as defined by corporate governance structures, when forming the environmental policy of an organization.

The main objective of the current study is to empirically examine the relationship between corporate governance and each of the quantity and the quality of corporate environmental disclosures in the UK, while controlling for some corporate characteristics as well as an in-depth exploration of quality identification and assessment issues. Accordingly, the thesis is expected to contribute to the accounting knowledge in three different but interrelated contexts. First, the thesis provides an updated documentary of UK corporate environmental disclosure practices and empirical evidence on the association between corporate governance mechanisms and the quantity of environmental disclosure in the annual reports of UK companies. Second, the thesis provides empirical evidence on the association between corporate governance mechanisms and the quality of environmental disclosure in the annual reports of UK companies, negating the traditional belief of quantity representation of quality and shifting disclosure quality perspective from volumetric measurement to

semantic assessment. Third, the thesis provides an in-depth exploration of quality identification and assessment issues, seeking to highlight the contribution made by the qualitative characteristics or attributes of information to overall corporate environmental disclosure quality.

This concluding chapter summarizes the results and findings of the current research and the interpretation of these results in light of the suggested conceptual framework, attempting to place them in perspective while highlighting the major contributions of the study. The chapter also discusses the potential implications of these findings in promoting environmental responsibility and accountability. The chapter concludes with an outline of the study's limitations along with some suggestions for future research.

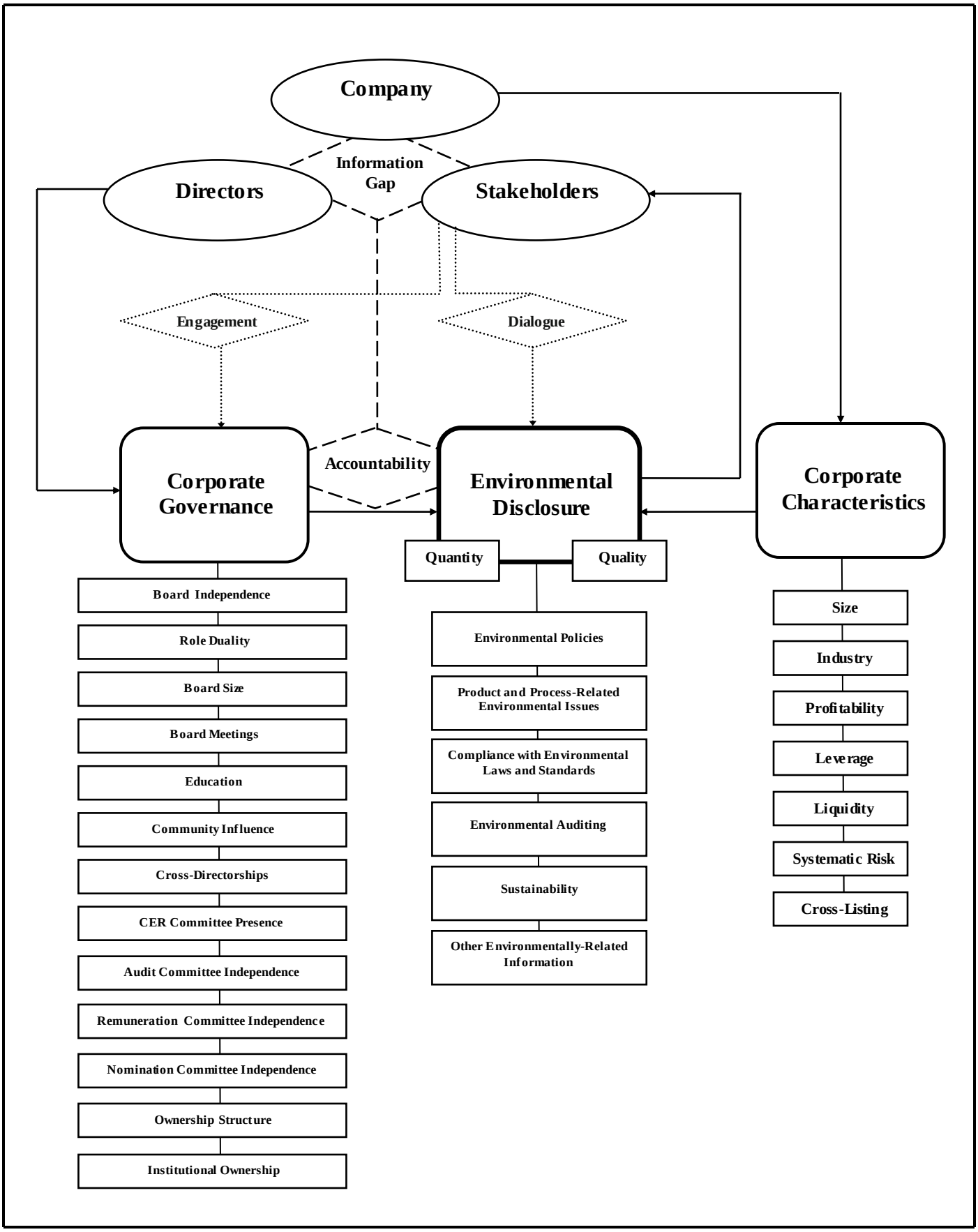
7.2 SUGESTED CONCEPTUAL FRAMEWORK

The present study explores the relationship between corporate governance and environmental disclosure. The study argues that better accountability of top management turns into an increasing level of stakeholders' environmental information satisfaction. Based on stakeholder-agency theory, the study's argument can be put forward as follows. Companies are increasingly considering the importance of demonstrating commitment to environmental responsibility, through the provision of comprehensive and high-quality environmental disclosure as means of managing their relationships with stakeholders. In this respect, sound systems of corporate governance are serving as accountability mechanisms, by which companies are made responsive to the rights and needs of stakeholders, through reducing information asymmetry. Therefore, it can be argued that the quantity and quality of corporate environmental disclosure directed to various stakeholders are enhanced when managers' opportunism is monitored by corporate governance mechanisms.

The suggested conceptual framework of the current study provides a comprehensive view of the relationship between corporate environmental disclosure and corporate governance mechanisms as shown in the following figure:

Figure 7.1

Suggested Conceptual Framework



At the heart of the analysis is corporate environmental disclosure. Figure 7.1 portrays the relationship between corporate governance and environmental disclosure, as controlled by corporate characteristics. Based on stakeholder-agency theory, it is argued that corporate environmental disclosure directed to various stakeholders is enhanced when managers' opportunistic manipulation is monitored by corporate governance mechanisms. As shown in the figure, stakeholders link to the company either through engagement or dialogue. Stakeholders' engagement with the company takes place through participating in corporate governance systems and ownership structures. Stakeholders' dialogue with the company takes place partially through environmental disclosure where companies report on their environmental performance. These links allow a correspondence between stakeholders' expectations and company's behavior, thereby enhancing the quantity and quality of environmental disclosure. Accordingly, corporate governance mechanisms adopted by the company give an indication about how stakeholders' interests are considered at the board level, as reflected in environmental disclosure practices.

Figure 7.1 highlights an important element in the existing linkage among the considered variables, that is, accountability. Both governance and environmental disclosure are based on the notion of accountability. A better accountability of top management turns into an increasing level of stakeholders' environmental information satisfaction. It is the board of directors who decides the definition of the accountability of the company, thereby affecting the environmental disclosures reported to stakeholders. In addition, by establishing external links with stakeholders, directors attract valuable resources vital to the companies' viability (Michelon and Parbonetti, 2010).

An information gap, also referred to as information asymmetry, exists between directors and stakeholders due to absence of information or manipulation of the disclosed information, resulting in failure to satisfy the stakeholders' expectations towards the firm's disclosure (Hooks *et al.*, 2002). Voluntary disclosures, including environmental disclosure, diminish informational asymmetries between a firm and its stakeholders (Brammer and Pavelin, 2008). It reduces the information gap as it provides stakeholders with relative confidence that the stock transactions occur at a fair price which increase stock liquidity (Diamond and Verrecchia, 1991; Kim and

Verrecchia, 1994). In addition, voluntary disclosure reduces uncertainty and, hence, reduces the information asymmetry which, in turn, reduces the cost of external financing (Healy and Palepu, 2001). Such "stakeholder reporting can also be viewed as a significant strategic tool that is used by management to improve communication with a company's stakeholders, providing a foundation for trust and openness" (Boesso and Kumar, 2007: 278-279). Accordingly, enhancing the quantity and quality of environmental disclosure is considered to be an effective means of reducing the information gap.

The Global Reporting Initiative (GRI) states that "A primary goal of reporting is to contribute to an ongoing stakeholder dialogue. Reports alone provide little value to inform stakeholders or support a dialogue that influences the decisions and behavior of both the reporting organization and its stakeholders" (GRI, 2002: 9). Alternatively, accountability supports stakeholders' relationship with the firm by providing information for different decisions. Therefore, accountability narrows the information asymmetry between the management and different stakeholders, and in between the different categories of stakeholders (Lev, 1989). Figure 7.1 highlights this important linkage, where accountability would increase the awareness towards the complexity of information disclosures and, hence, would reduce the information gap or asymmetry.

Based on the above considerations and given the absence of significant corporate governance variables in environmental disclosure studies, important relationships should exist among different mechanisms of accountability. Therefore, the present study aims at empirically examining the impact of corporate governance mechanisms, after controlling for company-specific characteristics, on the quantity and quality of corporate environmental disclosures in the annual reports of UK companies. The study is based on stakeholder-agency theory as a basic motive for the efforts made to reduce the information gap by reaching stakeholders' expectations about environmental disclosure through sound corporate governance structures.

7.3 FINDINGS AND INTERPRETATION

The first part of the empirical work aims at quantitatively investigating the relationship between corporate governance mechanisms and the quantity of corporate environmental disclosure practices in UK companies' annual reports. A variety of statistical tests and analyses, including descriptive statistics, correlation analysis and regression analysis, are undertaken in order to measure the extent and trend in corporate environmental disclosure quantity and to examine the relationship in question, while controlling for corporate characteristics. Finally, sensitivity analysis is carried out to check the robustness of the main regression analysis.

Descriptive statistics showed that there is a relatively low level of corporate environmental disclosure quantity in the UK, indicating the relative existence of an information gap or information asymmetry problem. However, there is an increasing trend in the quantity of environmental disclosure practices over the study period, emphasizing the increased awareness of corporate environmental responsibility by UK listed companies over time. Moreover, environmental auditing disclosure steadily represents the highest disclosure quantity level, while other environmentally-related disclosure represents the lowest disclosure quantity level. In addition, there is a great variation in the quantity of environmental disclosure practices among the sample companies. This finding might be the effect of examining a wide range of companies with different sizes and varying degrees of environmental sensitivity as indicated by the descriptive statistics of corporate characteristics. Descriptive statistics of corporate governance mechanisms are considered reasonable following the issuance of the Combined Code (2003) of corporate governance in the UK.

Results also revealed a significant association between environmental disclosure quantity and most corporate governance mechanisms. Specifically, higher environmental disclosure quantity is associated with lower percentage of independent non-executive directors on the board, separation of the dual role of CEO and chairman, higher frequency of board meetings, greater cross-directorships of board members, presence of board-level corporate environmental responsibility (CER) committee or responsible, lower percentage of independent non-executive directors on the nomination committee and lower ownership concentration. In addition, it appears that other corporate governance mechanisms are significant at some categorical levels

of environmental disclosure quantity. In other words, for some disclosure categories, higher environmental disclosure quantity is also associated with higher percentage of directors qualified in business, accounting and/or finance, higher percentage of independent non-executive directors on the audit committee and higher percentage of institutional ownership. Neither board size, community influence nor remuneration committee independence shows a significant association with environmental disclosure quantity, although the positive relationships are mostly in the expected direction, except for board size where a negative relationship is documented.

In conclusion, the overall results reinforce the study's general argument that corporate governance plays an important role in determining how companies mitigate agency problems and respond to the needs and interests of various stakeholder groups and, consequently, in determining the quantity of environmental disclosures in the annual reports. The significant association between environmental disclosure quantity and most corporate governance characteristics indicates the appropriate application of the corporate governance concepts in the UK context following the launching of the new paradigm in the corporate governance code, which in turn supports the level of environmental disclosure. In this respect, sound systems of corporate governance are serving as both monitoring and accountability mechanisms, by which managers' opportunistic manipulation is controlled and companies are made responsive to the rights and needs of stakeholders, thereby reducing information asymmetry or the information expectation gap. In other words, the stakeholder-agency theoretical framework adopted by the current study is greatly supported by the study's findings.

However, research should not be confined to the examination of the impact of governance mechanisms on the quantity of environmental disclosures only, rather than a consideration of the quality of the disclosed information as well. Focusing on the quantity of disclosures does not mean that such disclosures are of higher quality so as to reflect the true state of the company's disclosure strategies.

The second part of the empirical work aims at quantitatively investigating the relationship between corporate governance mechanisms and the quality of corporate environmental disclosure practices in UK companies' annual reports. A variety of statistical tests and analyses, including descriptive statistics, correlation analysis and regression analysis, are undertaken in order to measure the extent and trend in

corporate environmental disclosure quality and to examine the relationship in question, while controlling for corporate characteristics. Finally, sensitivity analysis is carried out to check the robustness of the main regression analysis. The results are discussed and analyzed in terms of the theoretical framework adopted and conclusions are drawn from statistical findings.

Descriptive statistics showed that there is a relatively high level of corporate environmental disclosure quality in the UK, indicating that companies are demonstrating their accountability by which they are made responsive to the rights and needs of various stakeholders. Furthermore, there is a slightly increasing trend in the quality of environmental disclosure practices over the study period, emphasizing the increased awareness of corporate environmental responsibility by UK listed companies over time. Moreover, compliance with environmental laws and standards disclosure steadily represents the highest disclosure quality, while environmental auditing disclosure represents the lowest disclosure quality. In addition, there is a great variation in the quality of environmental disclosure practices among the sample companies. This finding might be the effect of examining a wide range of companies with different sizes and varying degrees of environmental sensitivity as indicated by the descriptive statistics of corporate characteristics. Descriptive statistics of corporate governance mechanisms are considered reasonable following the issuance of the Combined Code (2003) of corporate governance in the UK.

Results also revealed a significant association between environmental disclosure quality and most corporate governance mechanisms. Specifically, higher environmental disclosure quality is associated with the separation of the dual role of CEO and chairman as well as with higher frequency of board meetings. In addition, it appears that other corporate governance mechanisms are significant at some categorical levels of environmental disclosure quality. In other words, for some disclosure categories, higher environmental disclosure quality is also associated with lower percentage of independent non-executive directors on the board, lower percentage of community influential directors, greater cross-directorships of board members, presence of board-level corporate environmental responsibility (CER) committee or responsible, higher percentage of independent non-executive directors on the audit committee, lower percentage of independent non-executive directors on

the remuneration committee, lower percentage of independent non-executive directors on the nomination committee, lower percentage of ownership concentration and higher percentage of institutional ownership. Neither board size nor directors' education show a significant association with environmental disclosure quality, although the positive relationship is in the expected direction for education, but not for board size where a negative relationship is documented.

A further analysis of the different sub-qualities of total environmental disclosure quality provided a deeper insight into the different quality dimensions of the company's disclosure strategy. Although board independence and role duality are no longer significant, results remain substantively the same either on the aggregate disclosure quality level or on the categorical disclosure quality level. However, it appears that the comparability dimension or the type of disclosure is the key quality dimension associated with most corporate governance mechanisms in explaining corporate environmental disclosure quality.

In conclusion, the overall results reinforce the study's general argument that corporate governance plays an important role in determining how companies mitigate agency problems and respond to the needs and interests of various stakeholder groups and, consequently, in determining the quality of environmental disclosures in the annual reports. The significant association between environmental disclosure quality and most corporate governance characteristics indicates the appropriate application of the corporate governance concepts in the UK context following the launching of the new paradigm in the corporate governance code, which in turn supports the quality of environmental disclosure. However, the insignificance of some corporate governance characteristics indicates the need for some attention either in revising the principles of the corporate governance code or in their application. In this respect, sound systems of corporate governance are serving as both monitoring and accountability mechanisms, by which managers' opportunistic manipulation is controlled and companies are made responsive to the rights and needs of stakeholders, thereby reducing information asymmetry or the information expectation gap. In other words, the stakeholder-agency theoretical framework adopted by the current study is greatly supported by the study's findings.

It is worth mentioning that although corporate environmental disclosure quantity in UK companies' annual reports is relatively low, corporate environmental disclosure quality is comparatively high, negating the traditional belief of quantity representation of quality and shifting disclosure quality perspective from volumetric measurement to semantic assessment. The finding of a relatively low level of environmental disclosure quantity can be interpreted as a reluctance or disinclination UK companies, particularly those of low environmental sensitivity, to report on corporate issues that have limited environmental impact. In other words, companies tend to be selective in disclosing environmental information about corporate activities. However, the finding of a comparatively high of environmental disclosure quality can be interpreted as a tendency of UK companies to disseminate comparable, understandable, relevant and verifiable environmental information, demonstrating their accountability in responding to the rights and needs of various stakeholders. Despite these results, environmental disclosure quantity was found to be more associated with corporate governance mechanisms than environmental disclosure quality, indicating the need for some attention either in revising the principles of the corporate governance code or in their application.

The main contribution or originality of the current research is its being the first study, to the best of my knowledge, to empirically address corporate environmental disclosure quality assessment in line with the international accounting standards framework. The study introduces to the academic literature an extensive four-dimensional framework for assessing environmental disclosure quality. The metric developed by the current study is the first comprehensive aggregate environmental-disclosure measure, as far as I am aware, that attempts to capture the qualitative characteristics of information in a manner consistent with well-supported frameworks elaborated by professional accounting bodies and standard setting organizations. It negates the traditional belief of quantity representation of quality and shifts disclosure quality perspective from volumetric measurement to semantic assessment. Such research investigating issues as environmental disclosure quality identification and assessment that are still relatively unexplored is quite essential.

Botosan (2004) recommends that quality identification and measurement issues and questions are critically important and worthy of careful attention, and suggests that

addressing these issues and questions, through the development of disclosure quality assessment frameworks in a specific research context, represents a necessary next step in the advancement of disclosure research. Furthermore, Beatti *et al.* (2004) highlights the pressing need for research effort devoted to developing new ways of documenting disclosure practices, identifying disclosure quality dimensions and exploring possible measurement proxies. In this respect, the current study is expected to fill an existing gap in corporate environmental disclosure literature by adding to a relatively underdeveloped research area which is corporate environmental disclosure quality assessment.

Consequently, it intends to systematically extend prior research within a UK context and to overcome the limitations inherent in prior research. The current study contributes to two streams of literature, the disclosure literature and corporate governance literature, by providing updated documentary and empirical evidence on the association between corporate governance mechanisms and each of the quantity and quality of environmental disclosure practices in the annual reports of UK companies, while controlling for corporate characteristics. In doing so, it (a) distinguishes between the different categories or areas of activity to which the environmental disclosure relates; (b) incorporates several corporate governance mechanisms as possible explanatory variables for the quantity and quality of corporate environmental disclosure practices of UK companies; (c) develops a broadly defined disclosure quality index in line with the international accounting standards framework that captures the distinct nature of disclosure items and that distinguishes the different types of information content; (d) examines the annual reports of a large and industrially diverse sample, that is, FTSE All-Share Index; (e) conducts both longitudinal and cross-sectional analysis over 2004-2007 inclusive; and (f) employs several types of regression models and statistical analyses, including descriptive statistics; Pearson and Spearman correlations; and OLS, GLS and pooled OLS regressions.

7.4 POTENTIAL IMPLICATIONS AND RECOMMENDATIONS

The major strength of the current study is its practical implications and its usefulness in providing data for further extensive environmental disclosure quality development. The informativeness or value relevance of environmental disclosure is a critical issue for standard-setters, investors, corporate decision-makers, and researchers (Berthelot *et al*., 2003). Accordingly, the study has the potential of attracting the attention of those concerned about corporate accounting and who may be interested in using its findings in order to inform any future endeavour to guide UK companies' corporate environmental disclosure practices, by embedding and integrating such guidance within companies' corporate governance structures.

This research has potential policy implications. Results of the study generally showed that many of the corporate governance factors investigated appear to have a greater and stronger influence on the quantity rather than the quality. Such finding has important implications for different policy makers. It helps to inform standard-setters and regulators about the importance of sound corporate governance in providing the foundations of comprehensive and quality environmental disclosure by establishing value-creating relationships with various stakeholders. Currently, there is much emphasis on increasing the quantity of the disclosed information, without much consideration as to the informativeness of such disclosure for stakeholders' decision-making, as being integrated into governance mechanisms. Particularly influential is the necessity of incorporating greater transparency into corporate governance structures, by introducing new environmental reporting laws and regulations, by reinforcing changes in company law relating to governance, by ensuring compliance mechanisms are in place and by benchmarking and auditing their implementation. In summary, voluntary initiatives of environmental reporting have to be underpinned by an appropriate legal framework if such initiatives are to be value-creative.

The study also provides valuable insights for managers wishing to enhance the efficiency of the environmental message that they convey to various stakeholders; for investors seeking to promote the long-term financial worthiness of their investments; for researchers aiming to constructively engage with corporate environmental disclosure research for the purpose of identifying the underlying relationships; and for environmentalists searching for innovative solutions to maintain long-term

sustainability and well-being through incorporating ecological concepts into other disciplines, including accounting. In particular, these different classes of stakeholders should pay careful attention to environmental disclosure quality rather than mere consideration of disclosure quantity in finding effective ways of addressing their ever changing and varied concerns and interests.

7.5 LIMITATIONS AND FURTHER RESEARCH

The study has some limitations that could be addressed in future research. The construction of disclosure indices is not free from subjectivity or bias. The use of an index of corporate environmental disclosure quality to arrive at an aggregate disclosure quality score involves attaching an equal weighting to the various quality dimensions. However, the assumption that every quality dimension is equally important to all stakeholders may be justified for the purposes of the current study. As no specific user group is of particular interest to the research, but rather all diverse stakeholder groups are targeted, this approach is deemed appropriate.

A further concern arises when focusing on annual report disclosures only, where environmental disclosures could be provided via alternative means of communication, although the heterogeneous nature of the information disclosed in these media impedes comparability and, hence, generalization. The study's findings are also limited by the potential problem of endogeneity. It is possible that governance characteristics and disclosure quality are endogenously determined.

In spite of these limitations, the results of the study contribute to the relevant literature in a number of ways. These limitations must be weighed against the contribution made to gain new perspectives into environmental disclosure practices. Further research that builds on and extends the ideas presented in this study may be fruitful. The comprehensive framework developed in this study for identifying and assessing environmental disclosure quality, is an initial step in the direction of examining environmental disclosure from the stakeholder perspective, negating the traditional belief of quantity representation of quality and shifting disclosure quality perspective from volumetric measurement to semantic assessment. Future studies can utilize and

expand on this framework to investigate other drivers of corporate environmental disclosure quality. The study's empirically derived and validated scale for environmental disclosure quality assessment could also help future researchers in studying the disclosure quality of other types of voluntary disclosures. Future researchers could examine the variations in the quality of voluntary disclosures along these lines.

Other additions to the literature would be to examine the association between corporate governance variables and environmental disclosure in media other than annual reports; to conduct comparative studies among different countries concerning the relationship between corporate governance and environmental disclosure; to undertake a more detailed industry classification and analysis, given the consensus on the importance attached to industrial sensitivity of environmental disclosure practices; to conduct qualitative analysis seeking the views and perspectives of acknowledged experts regarding the identity and nature of environmental disclosure quality; and to investigate different measures of corporate environmental performance other than environmental disclosure, such as analyst disclosure rankings. These suggestions can provide further insights into the relationship in question and might improve the explanatory power of future studies.

Moreover, the focus of disclosure quality assessment could be directed towards the interaction between quality measures and/or dimensions, rather than the relative importance of these measures and dimensions. In such multi-dimensional analysis, higher quality should be attached to those disclosures that combine different quality dimensions as well as different types of measures within each dimension.

Of considerable importance would be future studies on the auditing or assurance process of corporate environmental reporting including the mechanism of the process, the unique qualifications of environmental auditors and the characteristics of the audit committee necessary for undertaking such environmental auditing.

7.6 CONCLUSION

This chapter summarizes the results and findings of the current research and the interpretation of these results in light of the suggested conceptual framework, attempting to place them in perspective while highlighting the major contributions of the study. It is concluded that the overall results reinforce the study's general argument that corporate governance plays an important role in determining how companies mitigate agency problems and respond to the needs and interests of various stakeholder groups and, consequently, in determining the quantity and quality of environmental disclosures in the annual reports. In this respect, sound systems of corporate governance are serving as both monitoring and accountability mechanisms, by which managers' opportunistic manipulation is controlled and companies are made responsive to the rights and needs of stakeholders, thereby reducing information asymmetry or the information expectation gap.

The main contribution or originality of the current research is its being the first study, to the best of my knowledge, to empirically address corporate environmental disclosure quality assessment in line with the international accounting standards framework. The study introduces to the academic literature an extensive four-dimensional framework for assessing environmental disclosure quality. The metric developed by the current study is the first comprehensive aggregate environmental-disclosure measure, as far as I am aware, that attempts to capture the qualitative characteristics of information in a manner consistent with well-supported frameworks elaborated by professional accounting bodies and standard setting organizations. Such research investigating issues as environmental disclosure quality identification and assessment that are still relatively unexplored is quite essential.

Accordingly, the study has the potential of attracting the attention of those concerned about corporate accounting and who may be interested in using its findings in order to inform any future endeavour to guide UK companies' corporate environmental disclosure practices, by embedding and integrating such guidance within companies' corporate governance structures. However, it is unlikely that environmental disclosure could develop voluntarily without the interference of the regulatory power with more enforceable laws. In conclusion, voluntary initiatives of environmental reporting have

to be underpinned by an appropriate legal framework if such initiatives are to be value-creative.

The chapter also discusses the potential implications of these findings for promoting environmental responsibility and accountability. The chapter concludes with an outline of the study's limitations along with some suggestions for future research. The comprehensive framework developed in this study for identifying and assessing environmental disclosure quality, is an initial step in the direction of examining environmental disclosure from the stakeholder perspective, negating the traditional belief of quantity representation of quality and shifting disclosure quality perspective from volumetric measurement to semantic assessment. Future researchers can utilize and expand on this framework to investigate the variations in the quality of environmental and other voluntary disclosures along these lines.

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APPENDICES

Appendix A

Sample Companies

	Company Name	Industry
1	Abbot Group plc	Oil & Gas
2	Acal plc	Support Services
3	AEA Technology plc	Support Services
4	Aegis Group plc	Media & Photography
5	AG Barr plc	Beverages
6	AGA Foodservice Group plc	Housing Goods & Textiles
7	Aggreko plc	Business Support Services
8	Alizyme plc	Pharmaceuticals
9	Alpha Airports Group plc	Transport
10	Amec plc	Oil & Gas
11	Anglo American plc	Mining
12	Arena Leisure plc	Leisure Entertainment & Hotels
13	ARM Holdings plc	Information Technology Hardware
14	Arriva plc	Travel & Leisure
15	Ashtead Group plc	Business Support Services
16	Associated British Foods plc	Food Producers & Processors
17	AstraZeneca plc	Pharmaceuticals
18	Autonomy Corporation plc	Computer Software & Services
19	Aveva Group plc	Computer Software & Services
20	Avis Europe plc	Travel & Leisure
21	Axis-Shield plc	Pharmaceuticals
22	Axon Group plc	Computer Software & Services
23	Babcock International Group plc	Business Support Services
24	BAE Systems plc	Aerospace & Defence
25	Balfour Beatty plc	Construction & Building Materials
26	Barratt Developments plc	Construction & Building Materials
27	BATM Advanced Comm. Ld	Information Technology Hardware
28	BBA Group plc	Transport
29	Bellway plc	Housing Goods & Textiles
30	Berkeley Group Holdings	Construction & Building Materials
31	BG Group plc	Oil & Gas
32	BHP Billiton plc	Mining
33	Biocompatibles International plc	Health
34	Bloomsbury Publishing plc	Media & Photography
35	Bodycote International plc	Engineering & Machinery
36	Bovis Homes Group plc	Construction & Building Materials
37	BP plc	Oil & Gas
38	BPP Holdings plc	Support Services
39	British Airways plc	Airlines & Airports
40	British American Tobacco plc	Tobacco
41	British Polythene Industries plc	Packaging
42	British Sky Broadcasting Group plc	Media
43	Brown (N) Group plc	General Retailers

44	BSS Group plc	Support Services
45	BT Group plc	Telecommunications Services
46	BTG plc	Pharmaceuticals
47	Cable & Wireless plc	Telecommunications Services
48	Cadbury plc	Food Producers & Processors
49	Cairn Energy plc	Oil & Gas
50	Capita Group plc	Business Support Services
51	Care UK plc	Health
52	Carillion plc	Construction & Building Materials
53	Carnival plc	Travel & Leisure
54	Carpetright plc	General Retailers
55	Centrica plc	Gas Distribution
56	Charter International plc	Engineering & Machinery
57	Chloride Group plc	Electronic & Electrical Equipment
58	Chrysalis Group plc	Media & Photography
59	Clinton Cards plc	General Retailers
60	Cobham plc	Aerospace & Defence
61	Colt Telecom Group plc	Telecommunications Services
62	Communisis plc	Business Support Services
63	Computacenter plc	Computer Software & Services
64	Cookson Group plc	Engineering & Machinery
65	Croda International plc	Chemicals
66	Daily Mail & General Trust (A Shs) plc	Media & Photography
67	Dairy Crest Group plc	Food Producers & Processors
68	Dana Petroleum plc	Oil & Gas
69	Davis Service Group plc	Business Support Services
70	De La Rue plc	Business Support Services
71	Dechra Pharmaceuticals plc	Pharmaceuticals
72	Delta plc	Chemicals
73	Devro plc	Food Producers & Processors
74	Diageo plc	Beverages
75	Dialight plc	Electronic & Electrical Equipment
76	Dimension Data Holdings plc	Computer Software & Services
77	Diploma plc	Support Services
78	Domino Printing Sciences plc	Electronic & Electrical Equipment
79	DSG International plc	General Retailers
80	Electrocomponents plc	Support Services
81	Elementis plc	Chemicals
82	Emblaze Ltd	Computer Software & Services
83	Enterprise Inns plc	Restaurants Pubs & Breweries
84	Euromoney Institutional Investors plc	Media & Photography
85	Expro International Group plc	Oil & Gas
86	Fenner plc	Engineering & Machinery
87	Filtronic plc	Information Technology Hardware
88	Findel plc	General Retailers
89	FirstGroup plc	Travel & Leisure
90	Forth Ports plc	Transport
91	French Connection Group plc	General Retailers

92	Future plc	Media & Photography
93	Galiform plc	Support Services
94	Game Group plc	General Retailers
95	GKN plc	Automobiles & Parts
96	GlaxoSmithKline plc	Pharmaceuticals
97	Go-Ahead Group plc	Travel & Leisure
98	Goldshield Group plc	Pharmaceuticals
99	Greene King plc	Restaurants Pubs & Breweries
100	Greggs plc	Food & Drug Retailers
101	Group 4 Securicor plc(G4S plc)	Business Support Services
102	GUS plc(Home Retail Group plc)	General Retailers
103	Halma plc	Electronic & Electrical Equipment
104	Hays plc	Support Services
105	Headlam Group plc	Housing Goods & Textiles
106	Holidaybreak plc	Leisure Entertainment & Hotels
107	Homeserve plc	Business Support Services
108	Hunting plc	Oil & Gas
109	Imagination Technologies Group plc	Information Technology Hardware
110	IMI plc	Engineering & Machinery
111	Imperial Tobacco Group plc	Tobacco
112	Inchcape plc	Automobiles & Parts
113	Informa plc	Media & Photography
114	International Power plc	Electricity
115	Interserve plc	Business Support Services
116	Invensys plc	Computer Software & Services
117	ITE Group plc	Media & Photography
118	Jarvis plc	Business Support Services
119	JJB Sports plc	General Retailers
120	Johnson Matthey plc	Chemicals
121	Johnson Service Group plc	Business Support Services
122	Johnston Press plc	Media & Photography
123	Kelda Group plc	Water
124	Keller Group plc	Construction & Building Materials
125	Kier Group plc	Construction & Building Materials
126	Kingfisher plc	General Retailers
127	Ladbrokes plc	Leisure Entertainment & Hotels
128	Laura Ashley Holdings plc	General Retailers
129	Logica plc	Computer Software & Services
130	Lonmin plc	Mining
131	Low & Bonar plc	Construction & Building Materials
132	Luminar plc	Leisure Entertainment & Hotels
133	Marks & Spencer Group plc	General Retailers
134	Marshalls plc	Construction & Building Materials
135	McBride plc	Personal Care & Household Products
136	Meggitt plc	Aerospace & Defence
137	Metalrax Group plc	Engineering & Machinery
138	Millennium & Copthorne Hotels plc	Leisure Entertainment & Hotels
139	MITIE Group plc	Business Support Services

140	Morgan Crucible Company plc	Electronic & Electrical Equipment
141	Morgan Sindall plc	Construction & Building Materials
142	Morrison (WM) Supermarkets plc	Food & Drug Retailers
143	Morse plc	Computer Software & Services
144	Mothercare plc	General Retailers
145	National Express Group plc	Transport
146	National Grid plc	Electricity
147	Nestor Healthcare Group plc	Electricity
148	Next plc	General Retailers
149	Northgate Information Solutions plc	Computer Software & Services
150	Northgate plc	Transport
151	Oxford Instruments plc	Electronic & Electrical Equipment
152	Pace Micro Technology plc	Electronic & Electrical Equipment
153	Parity Group plc	Computer Software & Services
154	Pearson plc	Media & Photography
155	Pendragon plc	General Retailers
156	Pennon Group plc	Water
157	Persimmon plc	Construction & Building Materials
158	Premier Farnell plc	Support Services
159	Psion plc	Information Technology Hardware
160	Rank Group plc	Travel & Leisure
161	Reckitt Benckiser Group plc	Personal Care & Household Products
162	Reed Elsevier plc	Media & Photography
163	Regus Group plc	Business Support Services
164	Renishaw plc	Electronic & Electrical Equipment
165	Rentokil Initial plc	Business Support Services
166	Restaurant Group plc	Restaurants Pubs & Breweries
167	Rexam plc	Packaging
168	Ricardo plc	Support Services
169	Rio Tinto plc	Mining
170	RM plc	Computer Software & Services
171	Robert Walters plc	Support Services
172	Robert Wiseman Dairies plc	Food Producers & Processors
173	Rolls-Royce Group plc	Aerospace & Defence
174	Rotork plc	Engineering & Machinery
175	Royal Dutch Shell plc 'A'	Oil & Gas
176	RPC Group plc	Packaging
177	RPS Group plc	Business Support Services
178	SABMiller plc	Beverages
179	Sage Group plc	Computer Software & Services
180	Sainsbury (J) plc	Food & Drug Retailers
181	Scottish & Southern Energy plc	Electricity
182	SDL plc	Computer Software & Services
183	Senior plc	Aerospace & Defence
184	Serco Group plc	Business Support Services
185	Severn Trent plc	Water
186	Shanks Group plc	Support Services
187	Shire Ld	Pharmaceuticals

188	SIG plc	Support Services
189	SkyePharma plc	Pharmaceuticals
190	SMG plc	Media & Photography
191	Smith & Nephew plc	Health
192	Smith (DS) plc	Forestry & Paper
193	Smiths Group plc	Diversified Industrials
194	Spectris plc	Electronic & Electrical Equipment
195	Speedy Hire plc	Business Support Services
196	Spirax-Sarco Engineering plc	Engineering & Machinery
197	Spirent Communications plc	Information Technology Hardware
198	SSL International plc	Personal Care & Household Products
199	Stagecoach Group plc	Travel & Leisure
200	SurfControl plc	Computer Software & Services
201	Tarsus Group plc	Media & Photography
202	Tate & Lyle plc	Food Producers & Processors
203	Ted Baker plc	General Retailers
204	Telecom Plus plc	Telecommunications Services
205	Tesco plc	Food & Drug Retailers
206	The Vitec Group plc	Engineering & Machinery
207	Tomkins plc	Engineering & Machinery
208	Topps Tiles plc	General Retailers
209	Travis Perkins plc	Support Services
210	Trinity Mirror plc	Media & Photography
211	UK Coal plc	Mining
212	UMECO plc	Aerospace & Defence
213	Unilever plc	Food Producers & Processors
214	Uniq plc	Food Producers & Processors
215	United Business Media plc	Media & Photography
216	United Utilities plc	Water
217	Victrex plc	Chemicals
218	Vodafone Group plc	Telecommunications Services
219	VT Group plc	Aerospace & Defence
220	Weir Group plc	Engineering & Machinery
221	Wetherspoon (JD) plc	Restaurants Pubs & Breweries
222	Whitbread plc	Restaurants Pubs & Breweries
223	Wilmington Group plc	Media & Photography
224	Wolseley plc	Construction & Building Materials
225	WPP Group plc	Media & Photography
226	WS Atkins plc	Business Support Services
227	WSP Group plc	Business Support Services
228	Xaar plc	Electronic & Electrical Equipment
229	Yule Catto & Co plc	Chemicals

Appendix B

Decision Rules For Environmental Disclosure Quantity

- Any disclosure item that discusses or mentions the natural environment as well as health and safety and/or their relationship to the organization is recorded.

- All disclosures must be explicitly stated, they cannot be implied meanings.

- All disclosures that fit within the categories and items are to be included no matter how much it is advertising.

- All disclosure items are to be recorded regardless of their format, including financial statements, narratives, and non-narratives such as pictures, photographs, charts and graphical representations.

- Disclosures having more than one possible classification or containing two or more information items are classified under each relevant category or item.

- Repeated disclosures are not recorded, disclosures containing the same information item are considered only once.

Appendix C

Decision Rules For Environmental Disclosure Quality

- *Type: Monetary Quantitative/Non-monetary Quantitative/Declarative classification*

  A disclosure item containing a combination of two or all three disclosure types of monetary quantitative, non-monetary quantitative, and declarative information is classified as comprising the type of measure with the highest quality. Monetary quantitative disclosures have the highest priority, with non-monetary quantitative disclosures having the second priority while declarative disclosures have the lowest priority, in case of multiple types in one disclosure item.

- *Direction: Good/Bad/Neutral classification*

  A disclosure item classified as comprising good or bad news must contain specific and detailed information that make its economic direction clear. No specificity or detail that obviously deems the information item as positive or negative implies a neutral classification.

- *Outlook: Forward-Looking/Historical classification*

  A disclosure item containing a combination of both forward-looking and historical information is classified as comprising the time orientation with higher quality. Forward-looking disclosures have higher priority over historical disclosures in case of multiple outlooks in one disclosure item.

- *Verifiability: Verifiable/Non-Verifiable classification*

  A disclosure item is classified as comprising verifiable information if at least one of three situations exist: (1) the disclosure is found in one of the externally audited sections of the annual report; (2) the independent auditor report explicitly states that the environmental report is audited; and/or (3) the annual report contains reference in any section to an environmental disclosure audit being undertaken. Otherwise, the disclosure is classified as non-verifiable.